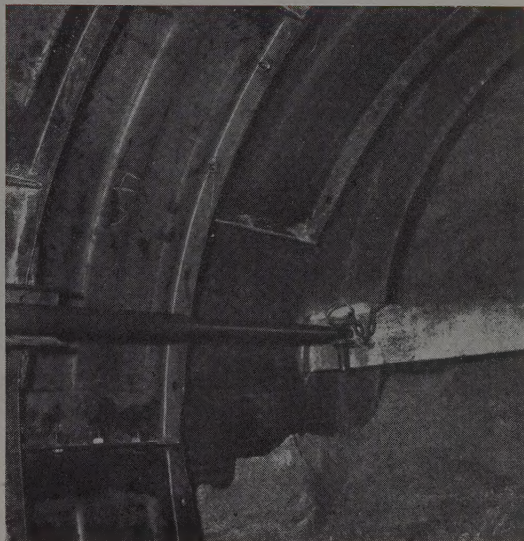


APRIL 1956



HANK EWART, general foreman, stands before the partial shield which was jacked forward into the sandy soil in unique driving operation. Shield is made of 3/16-in. plate rolled to shape of tunnel.



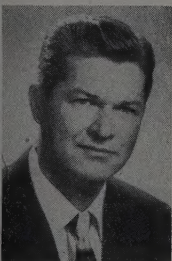
HYDRAULIC RAMS, supplied with oil at 10,000 psi by small electric motor driven pumps, push the shield forward. Rams with 20-in. stroke and 2-in. diameter are best.

Cost records prove value of—

New methods for sand tunneling

Long Beach tunnel features unusual techniques for driving, lining, grouting, and dewatering—plus an outstand-

ing safety record. Partial shield shown above is key to driving operation. Here's a close look at costs and methods.



By
LESTER HAUG
Construction
Engineer
Superintendent
Los Angeles County
Sanitation Districts

The method of construction used consisted of driving tunnels in two headings each from six shafts located an average of 1,260 ft. apart. The tunnel was mostly in sand with the ground water level from 6 to 10 ft. above the finished invert level. The tunnel was at a depth of approximately 40 ft. below the street level. By limiting the distance between shafts, the well point pumps used to dewater the shaft were also used to dewater the headings. The twelve short headings driven allowed hand excavation at the working face with muck removal to the shaft by hand tramping.

Muck storage capacity of approximately 60 cu. yd. was provided in the shafts by excavating below the tunnel level. This allowed tunnel to be driven on three shifts per day with muck being dumped into the boot below the tunnel level on the night shifts and removed from the shaft on

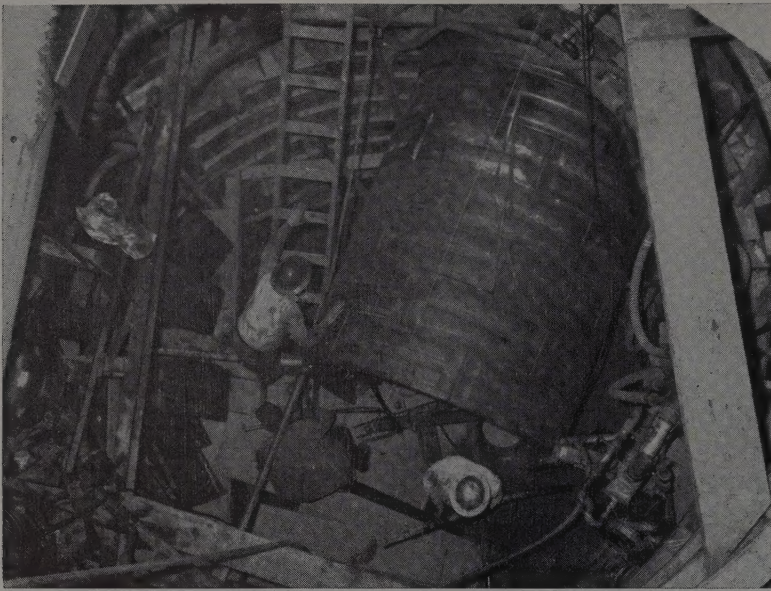
only the day shift. Since the job was located mainly in residential sections of the city, the elimination of noise-making equipment from the night shifts was a paramount consideration. With the crews at night working only underground, the noise was negligible.

Material was excavated from the shaft by a truck crane using a clam-shell bucket. The excavated material either loaded directly into dump trucks or into overhead hopper bins from which the trucks could be loaded.

Shaft construction

The first two shafts sunk were circular in design and consisted of timber spiling supported by rolled steel ribs. Spiling used was about 16 ft. long and each stage stepped in to decrease diameter by approximately 18

CONSTRUCTION of the Long Beach Interceptor Tunnel Sewer by District forces began in November 1954 and resulted in the development of new techniques for tunneling in sand and several pieces of special equipment. The 7,593-ft. long tunnel is the last link in a network which drains by gravity to the main pumping plant on the west side of the Los Angeles River.



VIEW DOWN shaft No. 1 shows tunnel liner plate erected across shaft to form a support and act as a guide to start the shield underground. There were six shafts like this one an average of 1,260 ft. apart. Thus the headings were kept short, allowing muck removal by hand tramping to the shafts. Dirt dumped in shafts by night shift was removed during the day.

in. When ground water was reached, well points were installed around the perimeter of the shaft and liner plates were installed as the ground was dewatered. These two shafts were constructed in this manner so that the start of construction would not be dependent on receipt of the shaft liner plate. The remaining four shafts were constructed entirely of 3/16-in. liner plate having a neutral axis diameter of 15 ft. When the shaft reached water level, well points were installed and the shaft diameter decreased to 14 ft. in order to have the well points outside of the liner plate.

A concrete manhole structure for access to the completed pipe line was constructed at each of the shafts. The shaft boot was backfilled with tunnel sand and No. 2 gravel to the subgrade of the concrete structure. The liner plates were not removed from the muck boot. After placing the concrete for the structure, the pump and well points were removed and the shaft backfilled as the concrete manhole riser pipes were placed. Shaft liner plates or timbers were removed as the backfilling progressed.

A power installation was provided by the Southern California Edison Company at each of the 6 shafts. 75 hp. connected service at 440 volts, 3 phase, 60 cycle was provided. Pumps, welders, and other electric powered equipment operated at this voltage. Step-down light transformers were used to provide lights for the tunnel. Three-conductor portable cord with screw sockets at intervals for lights was run into the tunnel from the shaft providing two 110-volt circuits and one 220-volt circuit to

each heading. No three phase power was required inside the tunnels.

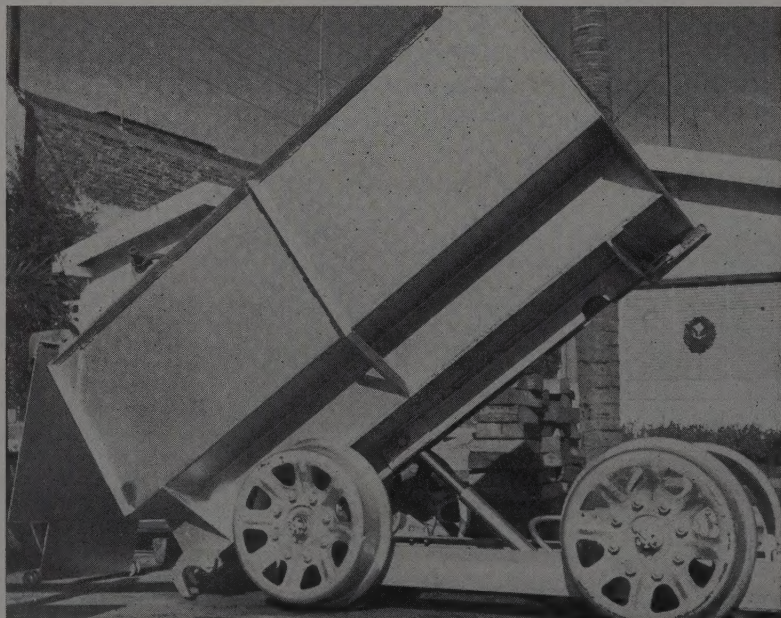
Tunnel driving

The excavated tunnel was supported by liner plate having a horse-shoe shaped section with a nominal neutral axis diameter of 80 in. The plates were manufactured by the Truscon Steel Division of the Repub-

lic Steel Corporation and delivered to Los Angeles by rail and to the job site by truck. The plates were 1/8 in. pressed steel, 37 11/16 in. long by 16 in. wide. The steel had a design weight of 120 lb. per ft. of tunnel.

The headings were advanced and liner plates installed by means of a partial shield that was jacked ahead of the liner plate. The partial steel shields covered 205 deg. of the tunnel circumference and were constructed of 3/16-in. thick plate rolled to the shape of the tunnel. The shields had an over-all length of 6 ft. A stiffening web and shoe welded inside the nose of the shield gave the cutting edge rigidity and strength. A 5-in. angle iron welded across the shield at a point 6 in. above the spring-line of the shield gave additional strength and provided a base for the jacks used to push the shield ahead. Hydraulic rams were attached to the shield and to a bracket bolted to the liner plate. A small electric motor driven hydraulic pump supplied oil to the rams at 10,000 psi.

Both 1 1/2-in. and 2-in. diameter rams having a 20-in. stroke were used with the 2-in. diameter being the most satisfactory. As the shield was advanced, correct line was maintained by relieving the ground more on one side than on the other and by controlling the amount of oil admitted to the rams. Elevation was maintained largely by two small sliding shoes 2 in. wide and 8 in. long curved to the shape of a sled runner that were welded to each side of the shield at the bottom of the leading edge. Maintaining a bench under these shoes caused the shield to ride up and removing the bench allowed



FOR END-DUMPING and manual handling, these lightweight muck cars were built. The cars have a 33-cu. ft. capacity struck and dump by means of a small ram and hydraulic pump. Rails were 18.4 lb. per yd. One man moved car if haul was less than 800 ft.

the shield to come down. When the tunnels were holed through between shafts, the shields were left in place and took the place of liner plate.

Tunnel dewatering was accomplished by means of well points and a 6-in. clay tile underdrain installed in the tunnel as the heading advanced. Well points were used at the face to dewater to a level several feet below the foot-blocks. While these points were in, the underdrain was installed in the dry. As the headings advanced the well points were moved forward and the ground water drained from the tunnel through the tile underdrain. A 2½-in. suction pipe from the well point pump at the shaft was used to remove the water collected at the heading well points. Two headings and the shaft were dewatered satisfactorily by the one 8-inch Stang well point pump at the shaft. From 3 to 7 well points were required at the tunnel face to lower the water table to the required level.

End-dump muck cars

The excavated material was hand loaded at the face into specially designed and constructed muck cars and hand trammed to the shaft. The cars were constructed of light weight steel bodies on light weight frame and trucks and ran on 24-in. gage, 18.4 lb. per yd. steel rails. The cars were constructed for a low loading height and end dumped by means of a small ram and hydraulic pump. The cars had a water-level capacity of 33 cu. ft. and were light enough for one man to push when loaded.

Approximately 75% of the tunnel was driven through sand formation and the remaining 25% through formations having impervious clay strata, shells and a small part through compacted sandy clay that was impervious to the ground water. Progress was best in all sand.

The problem of dewatering shafts and tunnel was most difficult where the waterbearing sand occurred between strata of impervious material at different levels in the excavations. The biggest problem in dewatering the sand was its fineness. Most of the samples tested graded more than 50% passing the 100-mesh screen and in some samples as much as 75% passed the 100-mesh screen. In most samples, there was no significant amount retained on the 50-mesh screen.

Three-man tunneling crews consisted of a lead-miner foreman, one miner, and one laborer for most of the work. Progress rate of the three-man crew was not affected by distance from the heading to the shaft until the heading had been advanced about 800 ft. One more laborer was added to the crew when the headings were farther than 800 ft. to help hand-tram the muck car to the shaft. Four headings were worked simultaneously, 3 shifts per day, 5 days per week.

(Continued on next page)

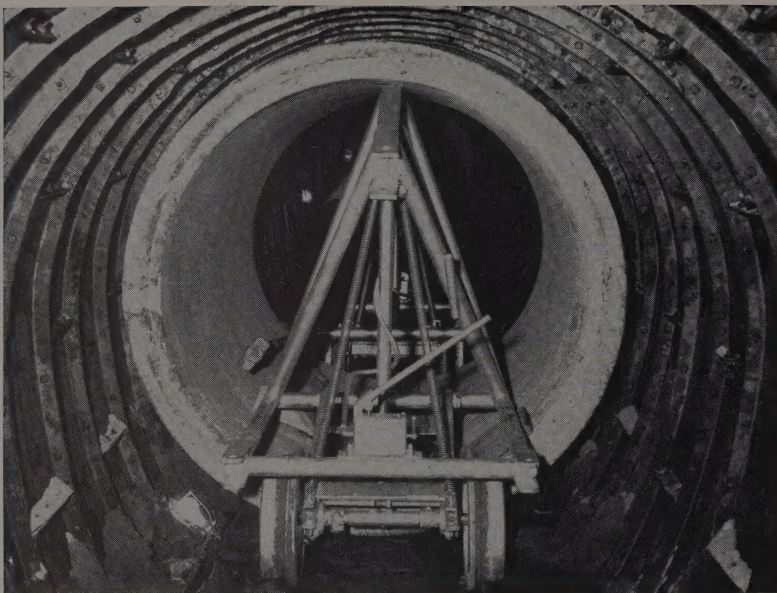
Summary of costs and progress

	Total	cost/ft.	Total	cost/ft.	See notes following
JOB SUPERVISION			\$19,041.54	\$ 2.51	(a)
TIMEKEEPING			6,165.43	.81	
SHAFT CONSTRUCTION					
Labor excavation	\$25,529.47	\$3.36			
Supports	16,736.53	2.20			(b)
Tools & supplies	1,331.70	.18			
Labor backfill & strip	6,778.30	.89			
TOTAL			50,376.00	6.63	(c)
TUNNEL DRIVING					
Labor	148,333.02	19.54			
Support (linerplate)	95,501.38	12.58			
Support (timber)	1,752.01	.23			(d)
Tools & supplies	35,865.96	4.72			
TOTAL			281,452.37	37.07	
TUNNEL LINING					
Labor, pipe placing	22,019.85	2.90			
Pipe, purchased	111,909.60	14.74			
Labor, place grout	2,639.11	.35			
Grout backfill	32,128.40	4.23			(e)
Tools & supplies	1,480.90	.19			
TOTAL			170,177.92	22.41	
MANHOLE STRUCTURES					
Labor	2,144.72	.28			
Manhole appurt.	2,738.96	.36			
Tools, mat. & suppl.	2,567.14	.34			
TOTAL			7,450.82	.98	(f)
EQUIPMENT					
Major equipment	12,155.67	1.60			
Rented Dist. equip.	9,334.22	1.23			(g)
Rented other equip.	3,778.68	.50			
Transportation	6,256.32	.82			
TOTAL			31,524.89	4.15	
SPECIAL VALVE STRUCTURE					
Labor	4,220.66	.56			
Tools, mat. & suppl.	4,173.58	.55			
TOTAL			8,394.24	1.11	
UNCLASSIFIED COSTS					
Power & water	12,093.70	1.59			
Telephone	932.05	.12			
Move gas & wat. mains	1,826.89	.24			
Cleanup (labor)	6,387.64	.84			
Repaving (contract)	3,193.74	.42			
Medical services	975.06	.13			
TOTAL			25,409.08	3.35	
CONSTRUCTION COST TOTAL			\$599,992.	\$79.	
OTHER DISTRICT COSTS					
Office engineering	1,786.				
Right-of-way	56.				
Surveying labor	8,763.				
Survey mat. & suppl.	312.				
Inspection labor	3,201.				
TOTAL			14,120.17	1.86	
TOTAL			\$614,112.	\$80.	

Notes:

(a) Includes field engineering. (b) Includes liner plate, steel shaft rings and timber spiling. (c) Total for 6 shafts. (d) Timber blocks salvaged from 12-ft. tunnel decreased cost of this item. (e) 2,762 cubic yards used at \$11.63/cu. yd. (f) Includes cost of 6 concrete boxes and risers installed in construction shafts. (g) District equipment rented was mainly truck cranes, pumps and well points.

Shaft number	1	2	3	4	5	6
Started shaft	11/22/54	11/22/54	1/4/55	2/6/55	3/14/55	4/19/55
Completed shaft	12/22/54	12/31/54	2/6/55	2/18/55	4/28/55	5/11/55
Completed west heading	2/4/55	2/11/55	4/15/55	4/29/55	6/14/55	7/13/55
Completed east heading	2/7/55	3/8/55	5/13/55	5/9/55	7/13/55	7/15/55
Started pipe laying	2/14/55	3/15/55	4/19/55	5/11/55	6/28/55	7/29/55
Completed pipe laying	3/14/55	4/15/55	6/27/55	6/9/55	7/28/55	8/24/55
Completed grouting	3/25/55	4/26/55	6/29/55	6/14/55	8/4/55	8/26/55
Shaft backfilled	3/31/55	5/5/55	7/12/55	6/23/55	8/16/55	9/19/55



SPECIAL JUMBO carries pipe through tunnel, running on same rails used to drive tunnel. When previously placed pipe is reached an extended nose wheel enters the previous pipe and takes the forward weight, while one set of rail wheels are retracted.

Other labor required in addition to the heading crews was a five-man shaft crew, four pumpmen, two truck drivers, two-man bull gang, one crane crew, and for about four months, an additional crane crew. Electricians, welders, mechanics as necessary were supplied from the crew working on construction of the District's 12-ft. diameter tunnel at San Pedro. One timekeeper, one pickup driver, one night walker, one general foreman, and one superintendent made up the rest of the crew.

The tabulation following is a summary of the tunnel driving record:

Total length of tunnel driven (ft.)	7,593
Number of shifts worked at tunnel driving	1,400
Average progress per shift (ft.)	5.42
Man-days worked	7,087
Man-days per foot of tunnel	0.93

The figure for the line "man-days worked" was obtained by adding all straight-time hours worked at driving tunnel and all overtime worked as straight-time hours (overtime hours multiplied by 1½ or 2, depending on overtime rate applicable). The shaft crew, timekeeping, and supervision are not charged as tunnel driving and are not included in the man-days tabulated above since these labor items were assigned separate work orders. All other labor such as crane crews, pumpmen, truckdrivers, electricians, etc., was pro-rated between tunnel driving, shaft construction, tunnel lining, etc. in accordance with the number of hours worked on each phase of the construction into which costs were divided.

Lining and grouting

The tunnel was lined by placing 60-in. diameter 1750 D loading standard wall reinforced concrete pipe inside the tunnel and grouting the annular space between the pipe and liner plate. The pipe was lowered to the bottom of the shaft by truck crane and hauled to the point of placing by a specially designed jumbo which could be moved through the pipe. Rail wheels on each end of the jumbo to which hydraulic rams were attached raised the pipe and it was then carried to the point of placing on the same rails used to drive tunnel. An extended nose wheel on the forward end of the jumbo entered the pipe previously placed, thus transferring the weight of the forward end of the jumbo from the rail to the pipe and allowing the front set of rail wheels to be retracted. The pipe was laid to grade on timber sills and blocked on both sides midway between the springline and crown to prevent it from floating.

Grouting from surface

The space between the outside of the concrete pipe and the tunnel liner plate was backfilled with a grout mixture containing 5½ sacks of cement to 2,700 lb. of dry weight plaster sand. Six-inch diameter steel grouting pipes were placed in holes bored from the street surface to the top of the liner plate at approximately 90-ft. intervals along the tunnel before the concrete pipe was placed in the tunnel. The grout was delivered in transit-mix trucks and grouting started at a pipe midway between shafts and proceeded from pipe to pipe toward

the shaft. Inspection holes 1½ in. in diameter were drilled through the top of every other concrete pipe in the line. When grout appeared at the inspection hole, it indicated that the grout had filled over the top of the pipe. The inspection holes were plugged with corks and later plastered over.

The grouting of the pipeline required 2,729½ cu. yd. of grout and 32½ cu. yd. of concrete for a total of 2,762 cu. yd. of material. Since the concrete manhole structures extended across the shaft from portal to portal there was approximately 7,500 ft. of pipeline backfill with grout or concrete. The backfill averaged 0.368 cu. yd. per foot of pipe line.

Pipe joints were plastered in two courses. The first course was made before grouting and the second or finished course was applied after the grouting.

Progress summary

Actual construction work was started on November 22, 1954, and the tunnel placed in service on September 23, 1955, with a total elapsed time of ten months from start to completion and use: A chronological progress record by shafts is shown on the preceding page along with a table of costs. In the table the cost per foot column is based on the total length of the job, 7,593 ft., and includes the distance through shafts and manholes.

The cost breakdown is taken from the Authorized for Expenditure cost report through January 1956. Some slight changes may be made in subsequent cost reports but will not materially affect the tabulation above.

Deducting estimated value of salvage material and equipment (\$9,000) and cost of the special valve structure (\$8,394.24) from the construction cost total of \$599,992.29 gives a net cost of \$582,598.05 or \$76.73 per ft. of tunnel. This cost can be considered as the job costs when compared with the original estimates.

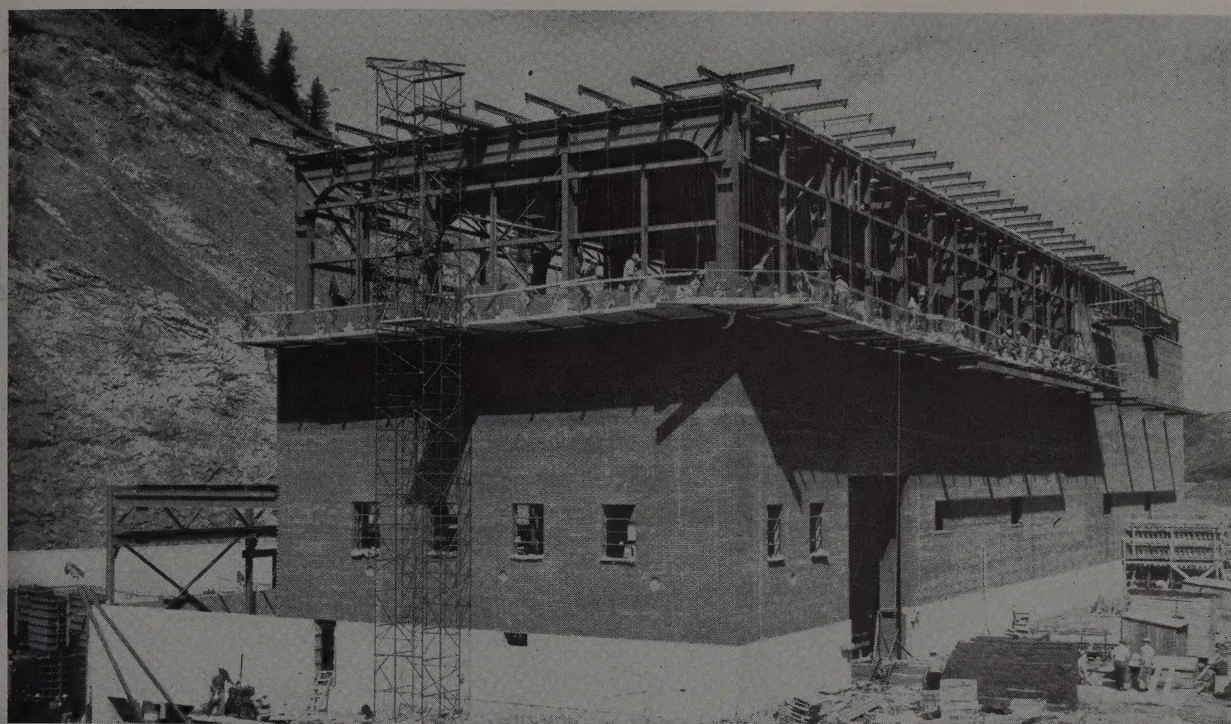
Excellent safety record

The total job labor cost (not including other District labor costs) was \$243,259.74. Medical expenses of \$975.06 was 0.401% of the labor item.

The tunnel driving labor cost of \$148,333.02 and the 7,078 man-days worked gives an average cost of \$20.96 per man-day.

Key personnel

A M Rawn is Chief Engineer and General Manager of the County Sanitation Districts of Los Angeles County. C. K. Compton is Assistant Chief Engineer. Harry Panaccione is the District's tunnel superintendent. Hank Ewart was general foreman on this job. The author is Engineer Superintendent for all District construction.



Reinforced brick for a powerplant

Bureau of Reclamation uses local material and a design to conserve steel for the walls of the powerhouse at Palisades Project in Idaho—Details of design and laying procedure are described.

REINFORCED BRICK masonry walls are the unusual feature of the powerplant of the Palisades Project now nearing completion in Idaho. It is the first Bureau of Reclamation powerplant to have superstructure walls of this design. The 114,000-kw. hydroelectric plant is a feature of the Bureau's Palisades Project on the South Fork of the Snake River near Irwin.

Economic considerations

Reinforced brick masonry was selected because brick was available at a reasonable cost in the nearby area. The short haul reduced the shipping cost and expedited the delivery of the material to the project. Also, brick masonry required considerably less reinforcement than reinforced concrete, and as design work was carried out during the Korean conflict, this resulted in a saving of steel, which was then a critical war material.

The powerplant has a substructure of reinforced concrete and a structural steel superstructure frame enclosed by 12½-in. reinforced brick masonry walls placed on a 14-in. thick

by 7-ft. high concrete base wall. The superstructure, divided transversely by a ½-in. expansion joint of cork board, is about 60 ft. wide and 246 ft. long. There is a 32-ft. wide by 68-ft. long lean-to on one side housing a machine shop. The main exterior walls are approximately 55 ft. high, including the base wall.

The walls are designed to withstand both windloads and earthquake stresses. Vertical intermediate structural steel wall-supports are provided between the main columns to reduce the span of the walls to a maximum of 13 ft. No supports for carrying the vertical load were provided in the steel frame. However, the brick work is anchored securely to the structural steel to resist lateral loads and buckling of the high walls.

Method of anchoring

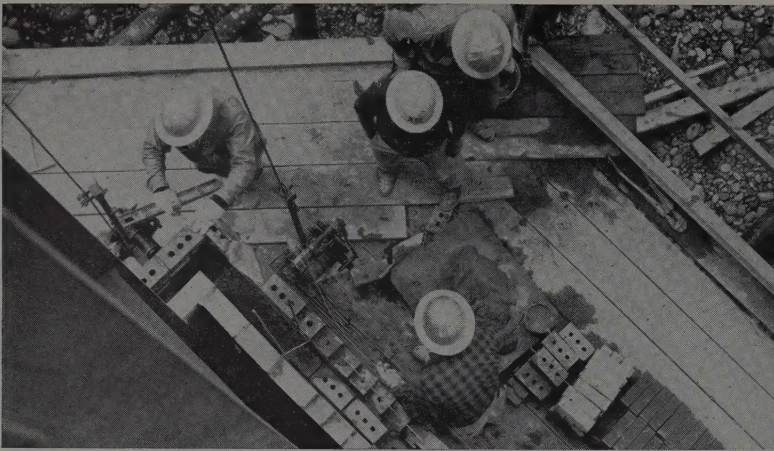
Anchors of 3/16- by 3-in. steel strap are placed every sixth brick course and fastened to the steel framework by stud-welded bolts (see drawing). Two ¼-in. round plain steel reinforcement bars are placed in the horizontal joints at every sixth brick course and 2 in. from the exterior and

interior faces of the wall. Two ¾-in. round deformed steel reinforcement bars are placed vertically, approximately 4 ft. apart, one bar being placed on each side of the center tier of the brick wall. The exterior and interior tiers of the brick wall are tied by ¼-in. round Z-shaped steel wall tie anchors placed every sixth brick course at about 4-ft. centers. Details of this reinforcement are shown in the accompanying drawing.

Types of bricks used

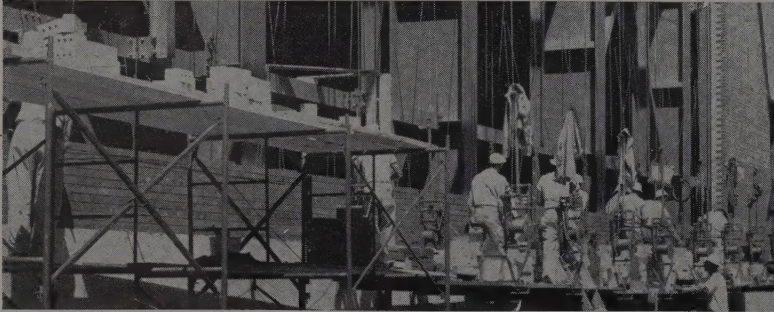
The brick used for the exterior face of the wall is standard size, dark red, scored vertically, and conforms to ASTM Designation: C216, Grade SW, and Type FBS. The common brick used for the interior face of the walls is standard size, light-colored, and conforms to ASTM Designation: C67. A common, double-thickness, filler brick was used in the center tier of the wall, except at locations where reinforcement ties and other special conditions required the use of standard size common brick. The A-1 mortar used consisted of one part portland cement, one-quarter part lime putty (high-calcium hydrated lime), and three parts aggregate. This mortar was also used for grouting, but additional water was required to produce a consistency which would permit placement without segregation of the mortar constituents.

All the exterior bricks were laid in



REINFORCING CONSISTS OF $\frac{3}{8}$ -in. vertical bars at 4-ft. spacing on each side of the center tier, and two $\frac{1}{4}$ -in. horizontal bars every sixth course.

USING STATIONARY and suspended scaffolding the three tiers were carried up without bonding headers. All joints were completely filled and were tooled concave.



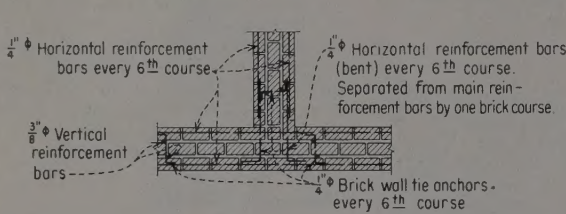
stretcher-bond courses, having approximately full $\frac{1}{2}$ -in. mortar beds. The exposed vertical joints between the bricks were $\frac{3}{8}$ to $\frac{1}{2}$ in., and were completely filled with mortar. All joints between the bricks which were exposed to view were tooled to form concave joints. Bricks were moistened thoroughly before being laid, and all surfaces upon or against which the bricks were laid were thoroughly cleaned and moistened.

Three tiers in wall

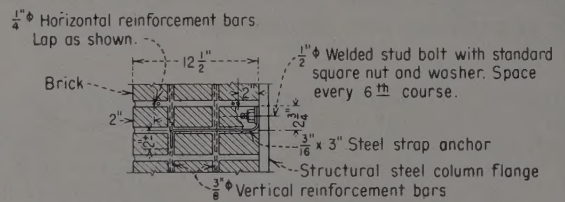
In laying the brick, the outer tier of bricks was carried up three brick courses, and the inner tier of brick was carried up not more than two brick courses. Grout was placed to a sufficient depth between the tiers of brick, so that when the filler brick was placed or floated to form the center tier, the grout filled all joints, without excess grout flowing down the outside faces of the brick wall. Bonding headers were not used.

Contractor

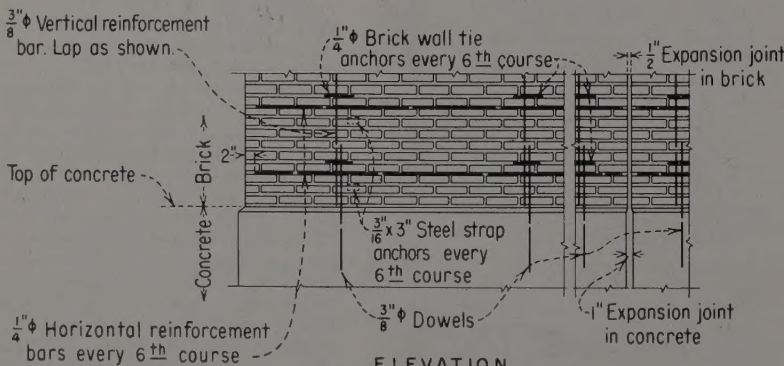
Construction of the Palisades powerplant under the current contract, held by J. A. Jones Construction Co. and Charles H. Tompkins of Seattle, Wash., is expected to be essentially complete this spring. First power from one of the plant's four 28,500-kw. units is expected by December 1956; the remaining three units will be placed on the line during 1957.



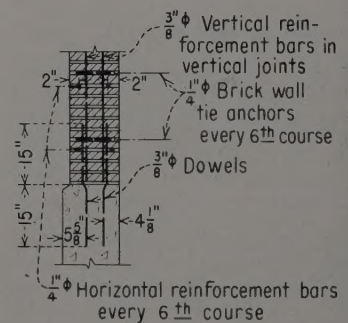
PLAN OF
TYPICAL WALL INTERSECTION



TYPICAL ELEVATION OF
STEEL STRAP ANCHOR INSTALLATION



ELEVATION



SECTION

TYPICAL DETAILS
BRICK REINFORCEMENT AND TIE ANCHORS IN WALLS



High permeability of subsoil permits—

Deep well dewatering in New Mexico

ON NOVEMBER 15, 1955, the Bureau of Reclamation received bids for the construction of the Atrisco Siphon, a 1,200-ft. siphon under the Rio Grande near the city limits of Albuquerque, New Mexico. D. D. Skousen & Son Contracting Co. was the successful bidder on Schedule II, the monolithic pour, at \$439,016. In addition to the siphon the contract includes two structures on the west bank of the river and three on the east bank.

Successful dewatering is the key to this job. At one point the siphon dips 38 ft. below the surface, a full 36 ft. below the water-table. The structures to be built require excavations extending to a maximum depth of 15 ft. below the natural water-table. Removing 100,000 cu. yd. of material from a site where the ground water is within 2 feet of the surface is tough enough, but it's even tougher under time pressure. Hydrographs of the Rio Grande near Albuquerque

show a sharp increase in stream flow during March, April, and May, so the job has to be completed before that time. There can be no delays.

The dewatering system, designed and supplied by John W. Stang Corp., consists of 15 gravel packed wells 36 in. in diameter and about 100 ft. deep, arranged on 90 ft. centers on the downstream side of the excavation. The deep well method was selected as the most economical scheme for dewatering this highly pervious soil. The material consists of sand and gravel, with cobbles up to 6 in. in diameter. This granular material extends to a very great depth which requires pumping unusually large quantities of water to secure the large drawdown required.

The drilling of the wells started on Dec. 5, to specifications set up by the Stang Corporation. On Dec. 14 the first deep well pump was put into operation and the next day the general contractor proceeded with the

excavation. Two more pumps were started on Dec. 17. As the wells were completed, additional pumping units were added until now there are a total of nine pumps in operation. These nine pumps enabled the contractor to remove about 50,000 cu. yd. in 2½ weeks including the excavation for the three structures on the east bank—in the dry. The pumps are moved ahead to new wells as required.

The siphon itself is being constructed with the aid of two slip form pavers which are moved ahead on short rails. The reinforcing steel is assembled in sectional units outside of the trench. When the slip form is ready to move for the next section, the reinforcing is swung into place.

This job is part of the Bureau of Reclamation's Upper Rio Grande Project. John Thompson is project engineer and Herman Carter is construction management engineer. For D. D. Skousen & Son, Gay Chappell is superintendent.



The Union Oil Center starts off with a—

400,000-cu. yd. excavation

**Foundation work is in full swing
on \$20,000,000 project—dirt removal hits**

**10,000 cu. yd. per two-shift day—lowest
level will drain by gravity.**

DIRT REMOVAL is nearly finished and pile driving is under way for the \$20,000,000 Union Oil Center development in downtown Los Angeles. Del E. Webb Construction Co. is the general contractor on the project, scheduled for completion in the summer of 1957. Main feature of the finished job will be a diamond-shaped 13-story building, one of the tallest in the area, which will have particular prominence because of the elevation of the site. The roof has been designed for the eventual construction of a heliport.

Removing the original buildings and clearing the site took place during the summer of 1955 and the excavation began near the end of August. Two Northwest 80-Ds did the work, one with a dragline, one with a shovel. As many as 60 trucks, varying in size from 10 to 14 cu. yd., were kept busy two shifts a day removing material. Yardage excavated per two-shift day ran from 6,000 to 10,000.

Pavement rings site

The excavation measures 300x600 ft. and at the deepest point is 74 ft. below the existing street. Paved city

streets line the site on all four sides. The walls were not kept vertical as the dirt moving proceeded. Such a plan would require rather extensive shoring and diagonal bracing ex-

tending inside the excavation which would interfere with the earthmoving equipment. Instead the walls have been sloped off in steps so that they stand without bracing. The



AS MANY AS 60 trucks were kept busy during excavation peak when yardage ranged from 6,000 to 10,000 per day. Trucks stopped at top of haul road before entering city streets to have loads raked to remove loose material.

Pay-As-You-Depreciate Plan Financing



A Modern Rock Quarry in Butler, Missouri

JOB-ENGINEERED FINANCE PLANS

The Alvis Limestone and Concrete Co., Butler, Mo., is set up to deliver crushed stone in volume and on tight schedules. Recently their quarry produced 65,000 tons of rock for a 15-mile strip of bituminous mat re-surfacing south of Butler, Missouri on Highway 71.

Mr. Alvis used C.I.T. PAY-AS-YOU-DEPRECIATE PLAN financing through Funkhouser Machinery Company, Kansas City, Mo., to put more equipment on this particular job. As he puts it: "C.I.T. has opened a new avenue of financing for me

... it has enabled me to purchase needed equipment which I might not have otherwise obtained."

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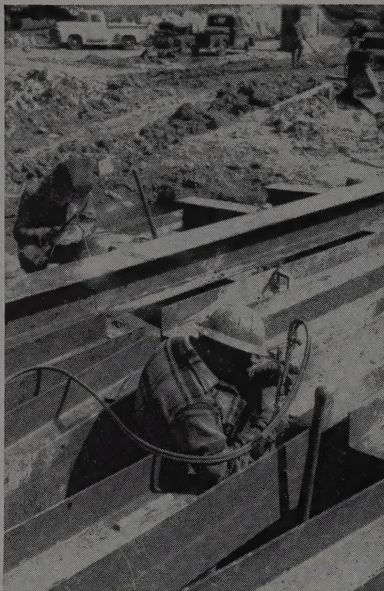
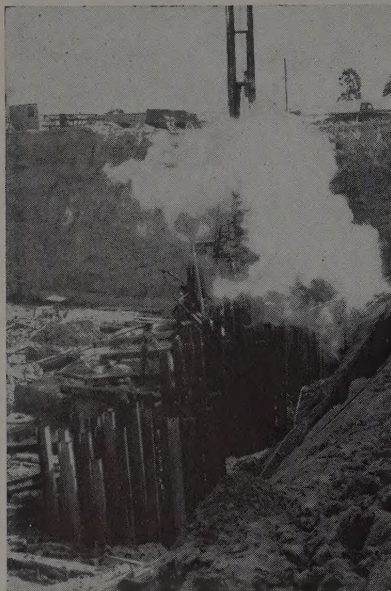
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four subsurface floors will be constructed to within 25 ft. of the walls of the excavation. Starting at the top, 25-ft. long H-beams will be placed horizontally every 12 ft. from the sides of the excavation to the newly constructed portion of the building. Then the final removal of earth will take place. As soon as enough dirt has been taken out another row of horizontal H-beam braces will be put in place, 12 ft. below the first row. When the final grade has been reached and the walls of the excavation are vertical, construction of the outside walls of the building will begin. As the building walls progress upward the braces will be removed from the dirt, allowing backfill material to be placed.

No water problem

Ground water has not been a problem on this job. Even the heavy rain near the end of January (8 in. in 36 hr.) did not cause any major trouble. An asphaltic concrete curbing about one foot high was built all around the job at the start and has kept surface run-off out of the excavation.

When the project is completed drainage from the lowest floor, 74 ft. below street level, will flow away by gravity. The unusual feature results from the fact that a storm sewer runs along the depressed Harbor Freeway just 500 ft. away.

Macco Corp. has a subcontract for pile driving. Two skid rigs with McKiernan-Terry S-8 hammers are at work and a track rig is being brought to the job. About 2,700 piles will be driven to a bearing strength of 50 tons. The piles are 12WF53 and will vary between 25 and 60 ft. long in place. Almost all of the piles must be cut off to bring them to proper grade. If the stubs are over 4 ft. long it is economical to weld them together to form new piles. The piles are being driven on about 3-ft. centers in clusters to support the column footings. There are about 200 column footings of various sizes and shapes resting on anywhere from 5 to 109 piles. About 3,700 cu. yd. of concrete will go into the footings. The entire job will take about 60,000 cu. yd.

So far the concrete has been placed with Whiteman power buggies (there will be 16 on the job later) or directly from the transit trucks. Some of the concrete will be brought to hoppers through baffled tremies 30 to 50 ft. long hung from the top of the excavation.

R. C. Nichols is resident engineer for Union Oil Company. Patrick L. Lawless is project architect for Pereira & Luckman. For Del E. Webb Construction Co. J. J. Fahey is manager of job operations, C. Drinkward is job superintendent, Gilbert A. Murray is assistant superintendent, and A. Guizot is job engineer. Edward T. Davies is chief of operations for Del E. Webb Construction Co. in the Los Angeles area.



ABOVE, LEFT—About 2,700 piles will be driven by Macco Corp., holders of piledriving subcontract. The piles are 12WF53 and vary between 25 and 60 ft. long in place.

ABOVE, RIGHT—Pile stubs are being welded together to form new piles. This is found to be economical if lengths are over 4 ft.

LEFT—Checking plans are (l to r) E. T. Davies, chief of operations for Del E. Webb in Los Angeles area; C. Drinkward, job superintendent; J. J. Fahey, manager of job operations.

BELOW—Concrete for pile caps is placed with Whiteman power buggies or directly from transit trucks. Baffled tremies 30- to 50-ft. long will be used later.



Which costs more—

Accidents or safety?

Accidents cost far more and here are some surprising dollars and cents figures to prove it.

By V. L. WHITE

Construction Engineer
Division of Industrial Safety
State of California

WESTERN CONTRACTORS have always approved of our competitive system, which looks with favor upon those who are able to produce a satisfactory product at a low cost. Contractors' costs are pushed upward by all sorts of conditions, one of which is an excess of accidents and injuries.

It is true that compensation insurance affords some protection, since it covers the medical bills and the required compensation payments for injured employees. But compensation insurance costs are not the same for every contractor, not even for those doing the same kind of work with the same number of employees.

Suppose that 50 men are to be employed for a period of four months, the total payroll being about \$100,000. Assuming a rate of \$4 per \$100 of payroll, the compensation insurance bill would be about \$4,000 without any experience modification. However, most well-established contractors operating on a fairly large scale are eligible for experience rating. This system gives credit where credit is due, so a good injury record extending over a long period of time might reduce the payment to 60%, or \$2,400. On the other hand, an exceptionally bad record might mean a 150% rate, or \$6,000 for the same protection.

Obviously, the one who pays a high rate for compensation insurance is in a poor position to compete with another who will be \$3,600 under him on this item when the bids are opened. But suppose that our friend (perhaps enemy is the better word) has a pencil that is otherwise sharp, and he comes up with the low bid. What are his chances of making a good profit? Poor! unless he improves his safety record, or has in-

cluded a large contingency item in his bid. Part of his trouble will come from indirect costs of injuries. The indirect costs are estimated to be at least three or four times the direct cost, which had better be somewhat less than the \$6,000 collected by the insurance company, or say \$4,000. The three-to-one ratio would eat up about \$12,000 of contingency money just for accidents that produced injuries.

Intangible costs

This loss is caused by job interruptions, physical damage to structures and equipment, lost time, confusion, and various extras that accompany any group of injuries. In fact, similar intangible costs accompany almost every accident, even those that produce no injuries, and we have not attempted to estimate how much they would increase the \$12,000 hidden cost item. Certainly this factor is of importance from the cost standpoint, because about 29 accidents out of every 30 produce no injury. The hidden costs of damaged materials, job delays, and poor workmanship accompany the 29 injury-free accidents as well as the 30th, although it is to be expected that the accident which produces an injury will normally involve the greater indirect cost.

The satisfying part is that injuries can be prevented by known methods that are effective. Once these methods are established and working well, they will prevent non-injury accidents also, since it is usually just a matter of chance as to which one of the 30 accidents produces an injury.

A fairly large contractor may find that by concerted effort he is able to

consistently hold his injury rate at one-half the average of previous years. This means that for each injury prevented, he has also avoided about 29 accidents that would otherwise have added to the cost of his jobs. Obviously, the indirect costs of accidents are far greater than most contractors believe, and are certainly greater than the three-to-one ratio would indicate, although such a ratio is probably quite accurate if non-injury accidents are excluded.

Many old-timers know of injuries involving indirect costs that almost sank the ship. Picture the worker who was fortunate enough to receive only a sprained ankle in the cave-in of a trench that was eight feet deep. In this case, the direct cost of his injury was less than five dollars and his discomfort was of short duration. However, adequate trench shoring that would have prevented the injury would also have prevented the need for extensive repairs to damaged street paving, where large pieces broke off and fell into the trench. The cost of realignment work and partial replacement of the tile pipe forced out of line and broken by the caving materials would have been avoided. Repairs to a water line, broken as a result of the accident, and the cleaning out of a water-filled trench would not have been an expense had there been no accident.

Sets of shoring had been placed at 10-ft. intervals at a cost of about 60 cents per lineal foot of trench. The shoring consisted of vertical pairs of planks, held in position by jacks extending across the trench. There would have been no trouble in this case had the sets of shoring been spaced at 5-ft. intervals and had a

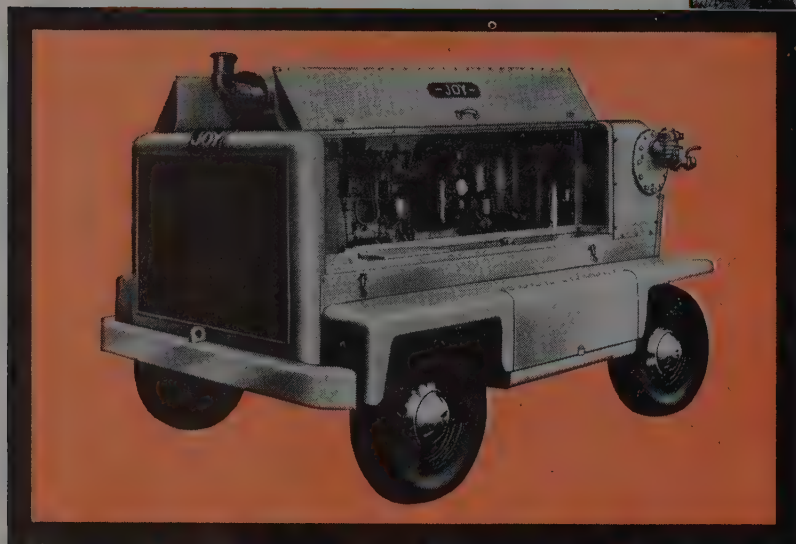


ADEQUATE TRENCH shoring costs money but the savings always exceed the costs. Only one out of thirty accidents results in injury but they all are full of expenses, most of them hidden.

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DIFFERENT



Joy RP-600 Airvane Rotary Portable Compressor furnishing air for a Joy Challenger Drill in an Illinois quarry.



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Joy engineers started with all accumulated rotary information—then went on from there to produce, we believe, the best rotary compressor available today. These Joy developments contribute materially to a superior machine:

THERMAL BY-PASS Heats oil quickly, keeps it flowing into compressor at correct temperature—*under all weather conditions*. Efficient oil circulation system provides immediate lubrication (no dry starts).

SPLINE COUPLING Does away with a clutch, gives greater power-transmission efficiency. It's light, takes little space, is virtually indestructible.

TWO-STAGE FILTER-SEPARATOR Removes oil from air and returns it to circulation system so efficiently that oil consumption becomes a minor item.

ECONO-MISER load control automatically selects most efficient engine speed, maintains steady pressure, saves fuel, increases compressor life.

SHORTEST TURNING RADIUS Compact design and low center of gravity give the shortest turning radius of all rotaries. With light weight, this spells *maneuverability*.

OTHER FEATURES (often overlooked) Body is waterproof —tool box and fuel tanks can be locked—doors stay open without props—three lifting rings support entire machine —push-button uses ether-capsule for cold weather starting.

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JOY

CONSTRUCTION EQUIPMENT MANUFACTURERS
FOR OVER HALF A CENTURY

continuous horizontal stringer been added at each side near the top of the cut. This change, at an additional cost of only \$45 for the whole 50 ft. of trench, would have eliminated the following:

1. Repair of broken 4-in. water line	\$ 46
2. Removal of broken paving and tile pipe . . .	40
3. Pumping out, and re-excavating saturated earth	212
4. Replacement of shoring, 50 lin. ft. @ 1.35	70
5. Replacement of damaged 12-in. tile pipe, 20 lin. ft. @ 5.00	100
6. Extra concrete street paving, 120 sq. ft. @ .75	90
7. Wasted manpower due to sudden stoppage of work	70
	\$628

This list is far from complete, and the addition of numerous less obvious costs would make it grow to unbelievable proportions. Unbelievable, that is to those who have not been subjected to examples so severely presented. Some contractors, having experienced this type of accident, have learned, all too readily, that the problem requires more than "good living to avoid bad luck." Why is it that many successful contractors have established a rigid policy of holding superintendents responsible for job safety, and have even gone to the expense of conducting safety meetings on company time? Why do they employ safety engineers and provide all materials, equipment, and executive backing needed to establish conditions favorable to accident control? Because they know by experience or observation that **safe construction is economical construction**, and that efforts to prevent injuries to workmen will also prevent disruptive and costly job mishaps.

Other severe penalties

Contractors are also exposed to other severe penalties for inadequate attention to accident prevention. Suppose a subcontractor, doing the stucco work, has agreed to use a scaffold erected by the general contractor. Suppose further that, because of sub-standard scaffold construction, not readily apparent to the subcontractor, the scaffold fails, and some of the subcontractor's employees are injured severely. Subrogation or third party suits often occur in instances of this kind. The injured employee, his employer or both, may bring action against a third party, the general contractor in this case, for damages and expenses resulting from the injury. The awards are usually quite high compared with the compensation costs, because it is difficult for anyone to place a low monetary value on a serious injury, especially a permanent disability. In some cases, awards so greatly exceed the amount of liability protection carried that bankruptcy and failure result, failures that would have been prevented by adequate attention to accident prevention.

Another possible source of expense to a California contractor is related

to work injuries involving "serious and wilful misconduct." The employer who faces this charge is usually an employer who does not do what he should do to prevent injuries. An injured worker who believes his injury due to the serious and wilful misconduct of his employer has a right to present his case before a referee of the Industrial Accident Commission. If it is found, after weighing all the evidence, that the worker's claim is correct, the decision will be unfavorable to the contractor, who will have to pay the worker a sum amounting to half the indemnity involved in that injury.

Employers cannot insure against "serious and wilful" losses so they must pay the money out of their own funds. Serious and wilful claims are not a frequent occurrence, but are a possibility if misguided superintendents wilfully choose a method known to be highly hazardous in preference to one that is safe and practical.

Savings exceed costs

Accident prevention requires real effort on the part of a contractor, but the costs are always exceeded by the savings. One important step in the prevention of accidents is maintaining the job in good physical condition. This all-important step will also serve as a visual reminder to workers that their employer is interested in conducting a safe job, and that unsafe actions and conditions are taboo.

How is a contractor to know how far he should go in matters of keeping his job reasonably free of physical hazards? What does his industry consider a proper standard? The need for answers to these questions was foreseen more than 30 years ago when the predecessor of the Division of Industrial Safety began to adopt sets of Safety Orders acceptable to committees chosen from the industry involved.

Orders for the construction industry were first adopted in 1918, and are now undergoing a third major revision. They provide a set of standards to guide the industry to what is considered a minimum level of job safety. The California Labor Code

makes it clear that those who violate or fail to comply with a Safety Order may be guilty of a misdemeanor. It follows that prosecutions by a District Attorney with assistance from the Division are not uncommon, especially in cases where there is flagrant disregard for human safety. Fine, imprisonment, unfavorable publicity, and the cost of preparing a legal defense are some of the penalties that may result.

The contractor who follows the Safety Orders is well on his way to a safety dividend in cash and goodwill, but there are other worthwhile steps to take. Time spent in promoting safe methods, and in educating those whose help is required, will pay dividends. Weekly safety meetings, with the foremen and supervisors participating in discussions of specific problems are helpful, as are records in the form of frequency and severity rates, or other methods for informing workers as to the effect of their safety efforts. All accidents should be followed by thorough investigation, written reports, and prompt corrective action. Posting of lists commending those foremen who have directed their crews throughout a given period without any injuries may also be worthy of trial.

Planning is another must if the job is to be top-notch from any angle. Normally, planning is done well on those parts of the project that appear difficult. If a heavy truss is to be placed, contractors can usually be depended upon to do the hard part safely and well. All details of this important operation are well arranged in advance; and as a result, the job is usually completed without mishap. In general, construction men have the ability to visualize a difficult construction operation; and through greater use of this ability, jobs can be organized to control many of the hazards that often receive little attention.

These are some of the steps that have been productive of worthwhile savings, but no one of them can do the job alone. Bind them together into a continuously operating program, with the vigorous leadership that such a program deserves.

Earthquake engineering conference to be held

A WORLD CONFERENCE on earthquake engineering will take place at the University of California, Berkeley, June 12-16. The meeting will bring together internationally recognized authorities on seismology and earthquake engineering from Japan, India, Germany, Colombia, Chile, Ecuador, New Zealand, Turkey, Pakistan, Greece, Mexico, and Italy.

Observance of the 50th Anniversary of the 1906 San Francisco earthquake-fire will be made in the key-

note address for the engineers meeting. This will be a personal experience review of the horrifying and unusual highlights of that greatest disaster in San Francisco history.

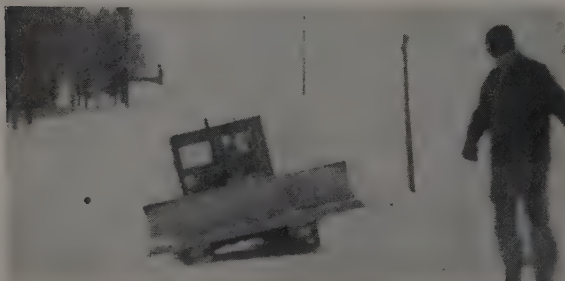
The 5-day meeting will be devoted to the presentation of technical papers on the latest seismic design and construction practices in all the major seismic areas of the world. Panel sessions will also be held to discuss design and construction practices in the different countries subject to seismic forces.



A County Engineer fights snow



I STRATEGY for the battle was planned by Pat Thomson and Supervisor Roy Ogle, as the lives of humans and stock were threatened. Low temperatures combined to intensify rural hardships and to keep the snow frozen almost solid, preventing normal removal operations. The county's 25 pieces of snow-fighting equipment were supplemented by hired tractors and state highway department rotaries. Work went forward on a 24-hr. basis, literally digging out the residents along the county roads.



FIGHTING the worst snow conditions since 1939, Pat Thomson, County Engineer of Douglas County, Washington, sends these striking action photographs to tell his story of struggling to keep open 552 mi. of school and mail routes.

The county lies just west of Grand Coulee Dam against the eastern foothills of the Cascades. Elevations range from 5,400 ft. at Badger Mountain, through the wheat-growing plateau at about 2,600 ft. down to 600 ft. at the Columbia River. Its 1,786 sq. mi. of area is larger than the entire state of Rhode Island. Agricultural holdings are large, which results in a widely scattered rural population, entirely dependent on its county road systems. Maintenance, including snow and ice control, is centered in three stations about 30 mi. apart, each manned with appropriate crews and snow fighting equipment. The rolling plains offer no protection from the snow-laden winds sweeping down from the mountains.

On November 16 the snow started and left a seasonal total of 113 in., with 39 in. on the ground early in February. On February 10 the winds came. The picture at the top of the page shows a school-bus route north of the county seat one hour after it had been plowed out, with the snow already 1 ft. deep in this cut. Plowed out four times in 8 hr. this cut was blocked tight at 5:30 p.m.

For a total of five days and nights the wind howled across the plains piling 400 mi. of roads with heavy, wet snow. Then the temperature dropped to below zero and the frozen masses of snow forced the fight shown in this series of pictures.

2 FREEZING (left) of the packed and wet snow into icy blockades is shown by this Caterpillar D7 moving over a drifted road on top of the snow, and hardly leaving marks of its grousers. Points of V-plows under these conditions tend to ride up the drift rather than penetrate. It was sometimes necessary to use pick-and-shovels to break out an opening at the edge of the drift for the plow to get a hold.



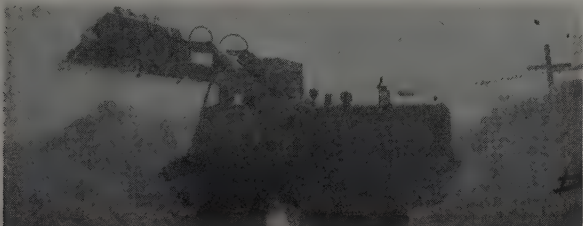
3-4 ON MARCH 3, three weeks later, the wind was still blowing and the school bus route shown at the opposite page was closed again that morning. The new drift (above, left) has an 11-ft. depth of frozen snow. To handle this type of road-block the machines were doubled and tripled (above, right). The three were able to make an aggregate distance of 3 mi.

in a 9-hr. shift, using the back-up-and-ram procedure. A single plow operating on a road near the county seat opened only 1,500 ft. of road in one shift. Men and machines worked seven days a week from Christmas until well into March. Many rural families were snowbound for more than two weeks at a time.



5 COSTS MOUNTED. Plows cannot batter frozen drifts day after day without a toll in costly replacements and repairs. Repairs increased and had to be added to plowing costs for the crews. At the peak, including the hired equipment, the costs of the county were running at \$3,100 per day. This Galion 118 is shown overcoming tough odds in plowing out a rural road with drifts 3 to 5 ft. deep, but extremely hard.

Even as the fight continued to clear the roads, the worries of the county engineer advanced to the thought of a "chinook"—warm wind and rising temperatures—that would take off the snow in less than a week. Then flood damage would be as severe as snow problems. Neither of these expenditures will improve the character of the county highways and will only tend to reduce funds badly needed for construction.



6 SOME DRIFTS were impossible to plow. They had to be shoveled out. This Pettibone-Mulliken Loader proved most effective in lifting off the tops of the deepest drifts and opening up the faces for the plows.

7 SNOW FIGHTERS can always dream—or it is a winter mirage. Sometime this spring Douglas County will look like this, and the operator will forget winter misery as acres of wheat turn green.





It's a problem of 'skin protection'

in your scaffolding too!

Has it ever occurred to you that there is a "skin protection" problem with steel scaffolding? And have you as a construction man ever stopped to think how important this protection is? If your men spend costly hours in assembling and dismantling rusty, pitted scaffolding then you know that rust is expensive—it slows up your erection time and definitely shortens the life of your scaffolding.

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It's the *galvanized* protective coating used exclusively on **UNIVERSAL EZEBILT SCAFFOLDING**. Now every single part of this top-quality scaffolding is covered with a lastingly smooth lubricative surface of

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CAT LOWBOWL SCRAPER

OUTLOADS COMPETITION AGAIN!

Last October, when another wheel unit was needed for Thomas M. Durkin and Sons Co.'s job near Mantua, New Jersey, a new Cat DW21-No. 470 Lowbowl Scraper was matched against a new "equally rated" scraper-unit. In this test, as in other on-the-job tests under actual working conditions, the Caterpillar unit definitely outproduced competition. As a result, the company purchased the DW21-No. 470—as well as a D9 pusher.

Here's *proof* again that Caterpillar's exclusive Lowbowl Scraper design pays off in bigger, faster loads. For completely documented test facts, including names and dates, see your Caterpillar Dealer. Judge for yourself how the DW21-No. 470 Lowbowl Scraper can step up your production and profits!

Caterpillar Tractor Co., San Francisco, Calif.; Peoria, Ill., U. S. A.

Details of on-the-job comparison!

JOB DESCRIPTION: Thomas M. Durkin and Sons Co. has a project near Mantua, New Jersey, preparing building sites, constructing streets, etc., for a 1000-home development. The company needed another wheel unit for its spread to make possible full pusher efficiency. To get a direct comparison of production, a new Cat DW21-No. 470 Lowbowl Scraper and an "equally rated" new 2-wheel scraper-unit were pitted against each other on the job under identical conditions. Here's some basic data on the units:

	DW21-No. 470	Scraper-unit A
Rated capacity, struck . . .	18 cu. yd.	18 cu. yd.
heaped . . .	25 cu. yd.	24 cu. yd.
Net weight	57,320 lb.	68,400 lb.
Engine horsepower rating . . .	300	300
Scraper operation	Cable	Hydraulic

A Caterpillar D9 torque-converter Tractor and "Tractor A" were demonstrated as pushers, the D9 push-loading the DW21-No. 470 and "Tractor A" push-loading Scraper-unit A.

CONDITIONS: *Material*—sand with some clay; density 2700 lb./cu. yd., very low swell. *Loading*—level cut, sand loose but not completely "dead." *Average haul distance*—2000 feet. *Average return distance*—2250 feet. *Haul grades*—200

feet, 4% average upgrade; 500 feet, negligible grade; 1300 feet, 3% average downgrade. *Travel road*—fair; packed sand.

TIME STUDY DATA:

	DW21-No. 470	Scraper-unit A
Average loading time, min.	.59	.63
Average haul, dump, return time, min.	3.88	4.35
Total no-delay cycle time	4.47	4.98
Waits and delays, averaged between units to facilitate comparison	.30	.30
Total cycle time, min.	4.77	5.28
Average load, bank cu. yd.	18	16.5
Trips per hour	12.6	11.3
Production, bank cu. yd./hour	227	187

REMARKS: The excellent loading characteristics of the Lowbowl Scraper, plus its fast pumping cable operation, gave the No. 470 a clean-cut advantage over hydraulically operated Scraper-unit A. The DW21, with its efficient power train, made more than one extra trip an hour on the 4250-foot haul and return. Though grades were light, they slowed down Scraper-unit A, while the DW21-No. 470 took them in stride. Result: the DW21-No. 470 handled an average of 1.5 more bank cu. yd. a trip than Scraper-unit A—or the equivalent of 400 more a 10-hour day!



The new two-wheel Cat DW21-No. 470 Lowbowl Scraper

A new four-wheel DW20-No. 456 Lowbowl Scraper is also available. Both units feature the new Turbocharged 6-cylinder Caterpillar Engine which delivers 300 HP at 1800 RPM and 10% more rimpull. New Lowbowl design loads more material with less resistance clear to the end of the loading cycle. All these and other new features add up to bigger, faster loads for you with Cat Lowbowl Scrapers.

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**BIGGER, FASTER
LOADS WITH CAT
LOWBOWL SCRAPERS**



Bid call on 14,000,000-cu. yd. fill is next as—

Oakland airport keeps expanding

AN \$11,500,000 expansion of Metropolitan Oakland International Airport will enter its second stage when the Port of Oakland calls for bids for dredging 14,000,000 cu. yd. of fill. The contract, which will be about \$4,000,000, will be awarded before June 30.

The expansion program is the largest of any now under way at airports in California and represents, as well, a major land reclamation project.

Construction started last October, when a \$1,086,700 contract was awarded to Healy Tibbitts Construction Company, of San Francisco, for the dike which will enclose an area of 1,400 ac. of submerged lands in San Francisco Bay south of the present airport.

Within the new area, the Port of Oakland will build a new 8,600-ft. runway, a new terminal building, heliport, roadways, taxiways, fueling facilities, and other improvements essential to jet air transportation.

Metropolitan Oakland International Airport is on the south shore of Oakland, Calif., where it was established in 1927 by the Port of Oakland, which also operates the harbor, industrial properties, and other waterfront developments.

The Port is an independent agency of the municipal government under the five-man Board of Port Commissioners headed by John F. Tulloch, contractor, who is president.

The entire administration is under the general manager, Dudley W. Frost.

The dike now under construction will be $4\frac{1}{2}$ mi. long. Healy Tibbitts Company is using clamshell dredges to first construct two parallel pilot levees, which will be 8 ft. above mean lower low water when the first phase is completed.

Later, when the pilot levees have seasoned, more fill will be added to bring the dike to 12 ft. above mean lower low water.

However, once the levee is at the 8 ft. elevation it is planned to begin filling in the operations area by hydraulic dredging of sand from the Bay bottom.

Bid call in May

Plans and specifications for the 14,000,000-cu. yd. fill are now being prepared and it is expected that the call for bids will be issued in early May. Bids will be received about a month later by the Board of Port Commissioners at the Grove Street Pier, Oakland.

Borings now being made indicate that more than adequate sand fill is available in a 1,000-ac. area southwest of the expansion area. The sand in that area is about 50 ft. deep.

The fill will be deposited in layers to settle gradually. Dredge discharge lines, floating and supported by

trestles, will run from 2,000 to a maximum of 15,000 ft.

The fill will bring the new airport operations area to an elevation of 6 ft. above mean lower low water. The project will take about a year and rapid settlement is expected, permitting an early start on the construction of the new runway and terminal building.

The Port's target date for the completion of the entire expansion is mid-1959—just about the time the airlines expect to go into the jet service.

The expansion plan was developed by the New York consulting firm of Tibbitts-Abbett-McCarthy & Stratton, which included an outline for a second new runway, farther out in the Bay, which can be added when expansion is again required.

The studies included in the development plan predict that the Bay Area population served by Metropolitan Oakland International Airport will increase from the 1950 figure of 2,681,000 to 3,530,000 by 1960.

The cost of the expansion is being paid from a \$10,000,000 bond issue voted by the people of Oakland, plus Federal aid and the Port's own revenues.

While the present project calls for an \$11,500,000 expenditure, Port officials are considering additional improvements which may boost the total as the program progresses.

FASTEST push tractor...

Pusher

One operator uses push-button control for perfectly matching direction, power, and speed of pusher and loader.



208 hp Diesel Engine (synchronized with rear engine)

scraper unit on rubber, you have full floating traction... tire treads follow tire treads...no loss of power required to flatten out rounded tire-tracks into flat track-tracks. With speed and power characteristics better matched...and matched rubber-tired traction... you get greater usable horsepower and coordinated pushing force when you push rubber with rubber.

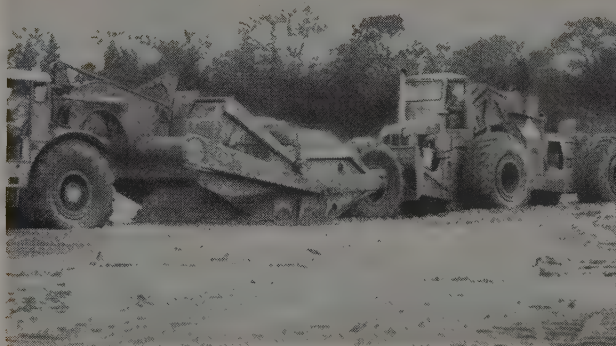
High-speed for fast-positioning — Rubber-tired speeds up to 20 mph forward and fast reverse, plus "articulated" steer, allow Twin-C Tractor to back-up fast, turn faster, position faster behind scrapers.

Floating push-plate, electric-controlled — Big 49½" x 88" heavy, concave push-bowl is positioned by an



Powerful 80,000 lb. Twin-C Pusher on big, wide-base tires push-loads scrapers faster in shorter distances...permits use of more scrapers in fleet...eliminates delays waiting-for-pusher.

Wet or dry...416 hp Twin-C Pusher has power and traction to lick any kind of scraper material. This Twin-C loaded 23-yd. scrapers fast in a wet fill to keep this job on schedule.



electric motor to take full advantage of contact area provided by scraper push-block. Operator can "feel" the load to determine best position of push-bowl for direct-line push to pile dirt in scraper fast.

Push-button electric-controls — Famous "instant" response electric-controls give you positive power-steer of pusher and power-positioning of push-plate. Electrical system is safe, trouble-free, weather-proof... same type controls used successfully on LeTourneau-Westinghouse scrapers for more than 8 years.

Power-transfer differentials — Exclusive power-transfer differential matches pull to traction, automatically applies power to wheels on firmest footing, keeps big pay-loads rolling out in sand, mud, and loose materials. "Twin-C" decreases time lost because of bad weather and soft going...increases length of work season...with greater profit possibilities.

If your fleet includes production scrapers of any kind, you will want full information on this Twin-C Pusher. Ask your LeTourneau-Westinghouse Distributor for complete details.

Tournapull—Trademark Reg. U.S. Pat. Off., Twin-C—Trademark TW-1025-G



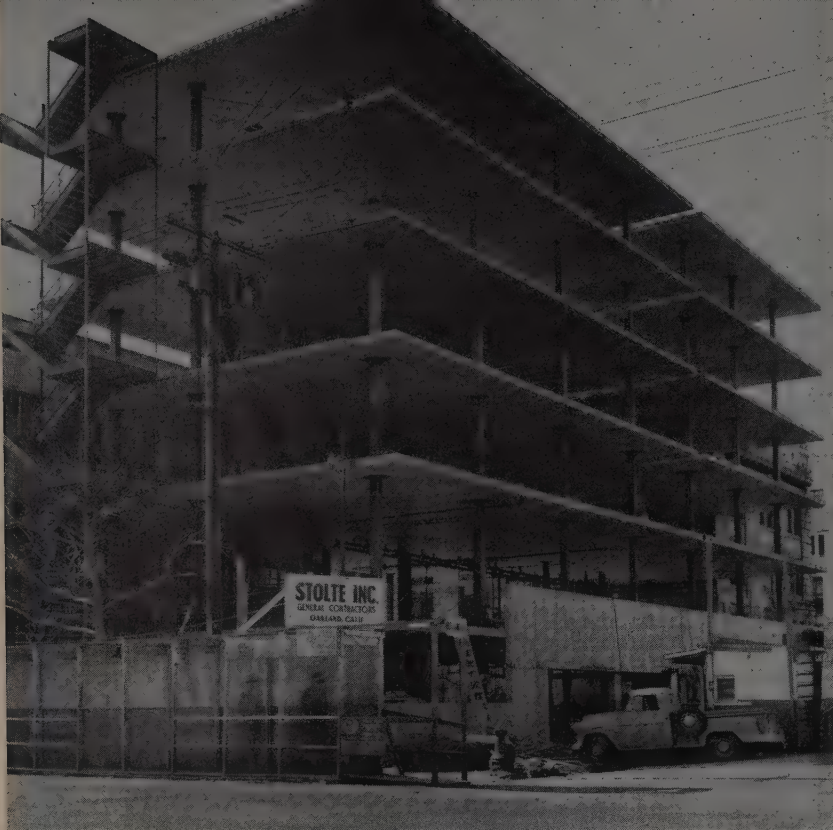
LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company

Setting a new lift-slab record

Western building is 70 ft. high from ground to roof slab—County jail on restricted site raised with automatic control system—Three months saved in construction time.



RECORDS ARE MADE to be exceeded and are frequently of short duration. In building construction they do serve to indicate progress in methods and techniques, particularly in the development of the modern applications of the art and science of building. Heights reached in lift-slab building construction have furnished the focus of interest in recent engineering and construction literature. Reports describe such a building in the early construction stage in Connecticut which will have a maximum height of 62 ft. A completed lift-slab building in Calgary, Alberta, is still higher and is reported to scale 64 ft.

West sets record

These reports of records, as known to date, lend special interest to the lift-slab structure in Sacramento, Calif., known as the New Jail Building for Sacramento County, located on the southwest corner of 7th and H Streets. Its height, measured from the top of the ground floor slab to the surface of the roof slab of the six-story building, slightly exceeds 70 ft. The building is described with emphasis on methods and equipment—with some new and unique features—employed by the lifting sub-contractor, Western Concrete Structure Co.

The new county building has a partial basement of small area and a cast-in-place ground floor serving as a casting bed for the lift-slab sections. Its long dimension, parallel to H

Street, is 125 ft. Its width is 59 ft. 3 in. to a height including the first and second floor levels above the ground floor. The upper portion of the structure has a width of 46 ft. 2 in. Added to these areas is a projecting section 25 ft. 8 in. by 29 ft. located at the southwest corner. Flanking elevator and stair shafts and containing administrative quarters, this section rises to the full building height and the lifting of its slabs involved the use of some temporary columns.

Lift-slab selection

In the consideration of factors influencing the design and construction methods for this building, the designers found several excellent reasons for the selection of the lift-slab procedure.

1. The site was restricted: two sides faced city streets and two sides were bounded by existing buildings, so close that it was sometimes necessary to knock off projections from the old structure during slab lifting. There was no available adjacent working area such as the old familiar methods would require.

2. The relative uniformity and repetitive pattern of the several floor areas made the casting of stacked slabs and the multi-story lifting procedure efficient and economical.

3. An estimated saving of three months in the construction time schedule was made possible because, immediately following completion of slab lifting, installations by all trades

could be performed on all floor levels simultaneously.

The proper evaluation of such factors, having so great effect on final costs of construction and real worth, often does not receive the deserved degree of study in the stage of planning and type selection.

Layout for lifting

In general, the building area was divided into two sections. Slabs for the upper four levels were lifted on 12 columns for one section, while 11 columns were used in the other section because of irregularity of floor area. The slabs for the first two levels above grade were divided into three sections, which were lifted on 8, 8, and 12 columns respectively. Closure spaces between sections—later cast-in-place—were 3 ft. wide. The lift-slab sections were uniformly 9 in. thick and stacked for successive lifting. Spans were relatively short to produce, with the thick slabs, a rugged construction with deflections so limited that cell anchorage would be permanently satisfactory. The columns were uniformly 10 in. square in outside dimensions, fabricated from plates of variable thickness.

Lifting phases

The lifting process started with columns extending beyond the second lift level and was a carefully planned phase operation. In Phase 1, the upper slab was raised to its

This Good Roads Spreader Team

...CUTS PAVING COSTS IN HALF!



The "Odell" Aggregate and Asphalt Spreader—designed with the contractor in mind, features low initial cost and exceptionally fast operation. Greater capacity—faster spreading, with less man-power, results in savings of over 50% in spreading costs.

The many "Odell" features, including positive one-time spread-depth adjustment and smooth, clean spread pattern, eliminates the need for 5 and 6 man crews... results in lower operating costs.

The Good Roads Handy Aggregate Spreader—spreads from powder-fine carpet up to 3-inch depth. It completely eliminates the danger of streaks and spotty spread... automatic transmission permits forward and reverse operation without shifting or de-clutching. Micrometer spread depth control eliminates constant re-setting. Once set, it remains constant for the entire job.



For complete details and specifications on the Good Roads spreader team and how it can help cut your paving costs, see your nearest Good Roads distributor, or write to:



GOOD ROADS MACHINERY CORPORATION

MINERVA, OHIO



SNOW PLOWS



ICE CONTROL SPREADERS



LEAF COLLECTOR



SCAVENGER



AGGREGATE AND ASPHALT SPREADERS



CONTROL of lifting is through the electronic panel (above, left) which automatically maintains slab level during jacking. One flip of the switch raises or lowers the slab 1/64 in. Jack (above, right) mounted on the column top includes an air-actuated hydraulic pumping unit.



ROLLING TOWER is effective aid in mounting jacks on the column tops. Projection on jack base provides moment connection.

assigned temporary position and crossed guy lines were secured to stay it in all directions. Successive slabs were raised, sometimes two slabs together, and the lower slabs fixed in their final positions.

Successive operations of Phase 2 and Phase 3 involved the extension of columns, raising of remaining slabs and securing each pair of slabs in final position in the structure.

In addition to the placing of staying guys as each phase level was reached, a further precaution was taken to prevent any departure from accuracy of vertical alignment. At the end of each lifting phase, the structure was carefully checked and plumbed so that immediate adjustment might be made if required. During the whole operation, no divergence greater than 1/4 in. occurred.

With the number of slabs and of se-

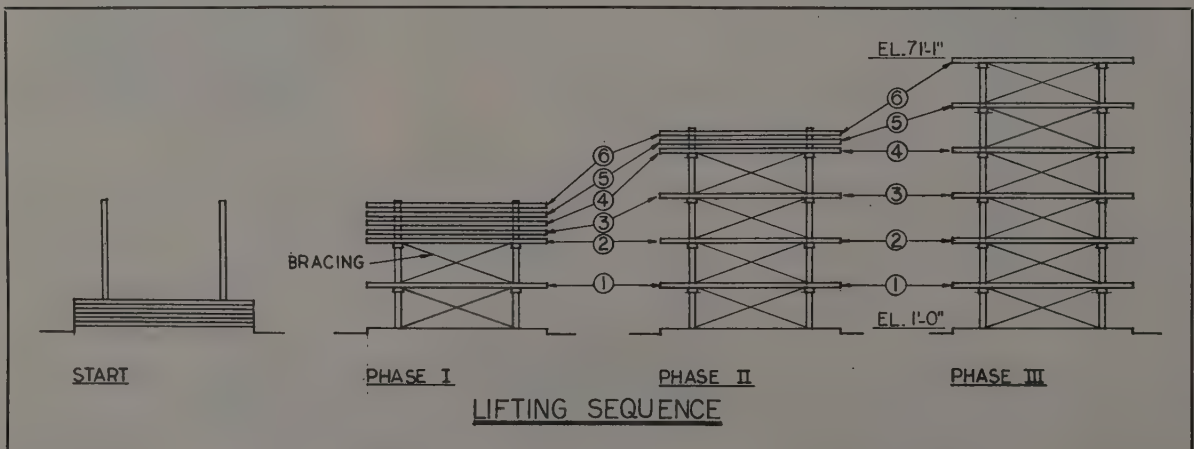
quences involved in the lifting, continuity of operation was important in both time and economy and it was found feasible to carry on round-the-clock lifting.

Another desirable feature of lift-slab construction was demonstrated. Lifting proceeded during the period of heavy rains that produced flood conditions in the region—weather conditions that would dictate the shutting down of operations on many building projects of types in more common use.

Specialized methods

The lifting sub-contractor has developed distinctive methods and equipment which were employed in the jail building. A still more specialized operation—not used in this structure, is performed by the com-

(Continued on page 66)



NOW

HUBER-WARCO TANDEMS OFFER torque converter 2-speed transmission



Two new important features added to Huber-Warco medium and large sized tandem rollers are: a torque converter and a two-speed transmission.

The torque converter offers all of the advantages of a fluid coupling, with these important plus features: (a) available power is doubled, (b) the roller maintains approximate rolling speed regardless of grades encountered, and (c) fuel consumption is reduced.

Advantages of the two-speed transmission are: (a) at slow rolling speeds, the use of low gear maintains sufficient RPMs at tailshaft to keep governor effective, (b) makes correct gear ratio available to meet any work load or desired rolling speed, thus reducing strain on converter and engine, and (c) allows the engine to maintain sufficient RPMs to provide

hydraulic pressure for fast steering at low rolling speeds.

Other important Huber-Warco features include: the exclusive guide roll assembly that will not "scuff" (factory perfect adjustment for the life of the roller); full hydraulic steering with variable speed adjustment; two braking systems; dual controls; close curb clearance and many other features that make the Huber-Warco tandem line outstanding.

Huber-Warco medium and large sized tandems are gasoline and diesel powered and are available in 5-8, 8-10, 8-12 and 10-14 ton models. A 3-5 ton tandem with water cooled engine and torque converter as standard equipment, is also available.

Write for specifications.

A Product of Huber-Warco Company, Marion, Ohio, U. S. A.

Represented by

FOULGER EQUIPMENT CO., INC.

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CAIRD ENGINEERING WORKS

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WESTERN TRACTION COMPANY

2230 Third St., San Francisco 7, Calif.
16th and American River, Sacramento, Calif.



Long boom needed to dig— Deep trench for storm drain

NOW UNDER construction is the Cabrillo Ave. storm drain in Torrance, Calif. Steve P. Rados, Inc., holds the \$683,000 contract and expects to finish the job in August 1956.

Keeping interference to traffic at a minimum is one of the prime considerations since Cabrillo Ave. is a main thoroughfare in Torrance and the 28-ft. deep trench runs right down the middle of it. During the day the contractor's equipment works on one side of the excavation only and traffic is confined to the other. Eight pipe sections are brought to the site and placed each day—no sections are stockpiled on the job. Backfilling follows closely and a temporary cold-mix paving is placed over the top. At night motorists notice only about

200 ft. of barricaded open trench.

The trench is 9 ft. wide at the bottom and 18 ft. wide at the top, which prevents excavating equipment from

Equipment List

- 1—Northwest 80D backhoe
- 2—Model 6 Northwest laying cranes
- 1—Northwest 25
- 1—Ottawa Hydra Hammer
- 2—D6 Caterpillar tractors
- 1—D4 Caterpillar tractor
- 1—Caterpillar No. 12 blade
- 1—Hough Payloader
- 1—Rogers 400-ton jack
- 2—Le Roi compressors
- 5—International dump trucks
- 1—International flatrack truck
- 1—Chevrolet flatrack truck



THE 84-in. pipe sections are placed with a Northwest Model 6—an average of eight are placed and covered each day.



FIRM SOIL requires little shoring. Trench at this point is 28 ft. deep, 9 ft. wide at top, 18 ft. wide at the bottom.

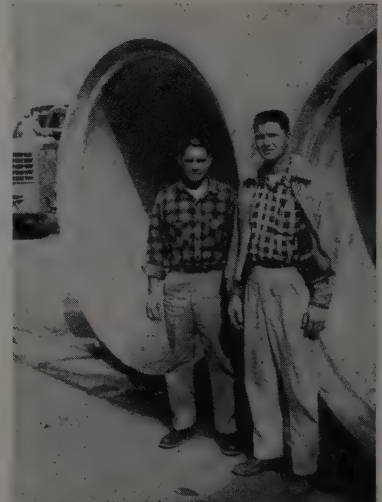
PRINCIPAL PIPE QUANTITIES	
Length (ft.)	Diameter (in.)
1,900	84
2,100	75
3,800	72
1,400	69
2,000	54
1,700	39, 36, 33
2,300	24, 21, 18, 15

straddling the trench. The long reach required for the 28-ft. depths is supplied by a Northwest 80D with a 30-ft. boom.

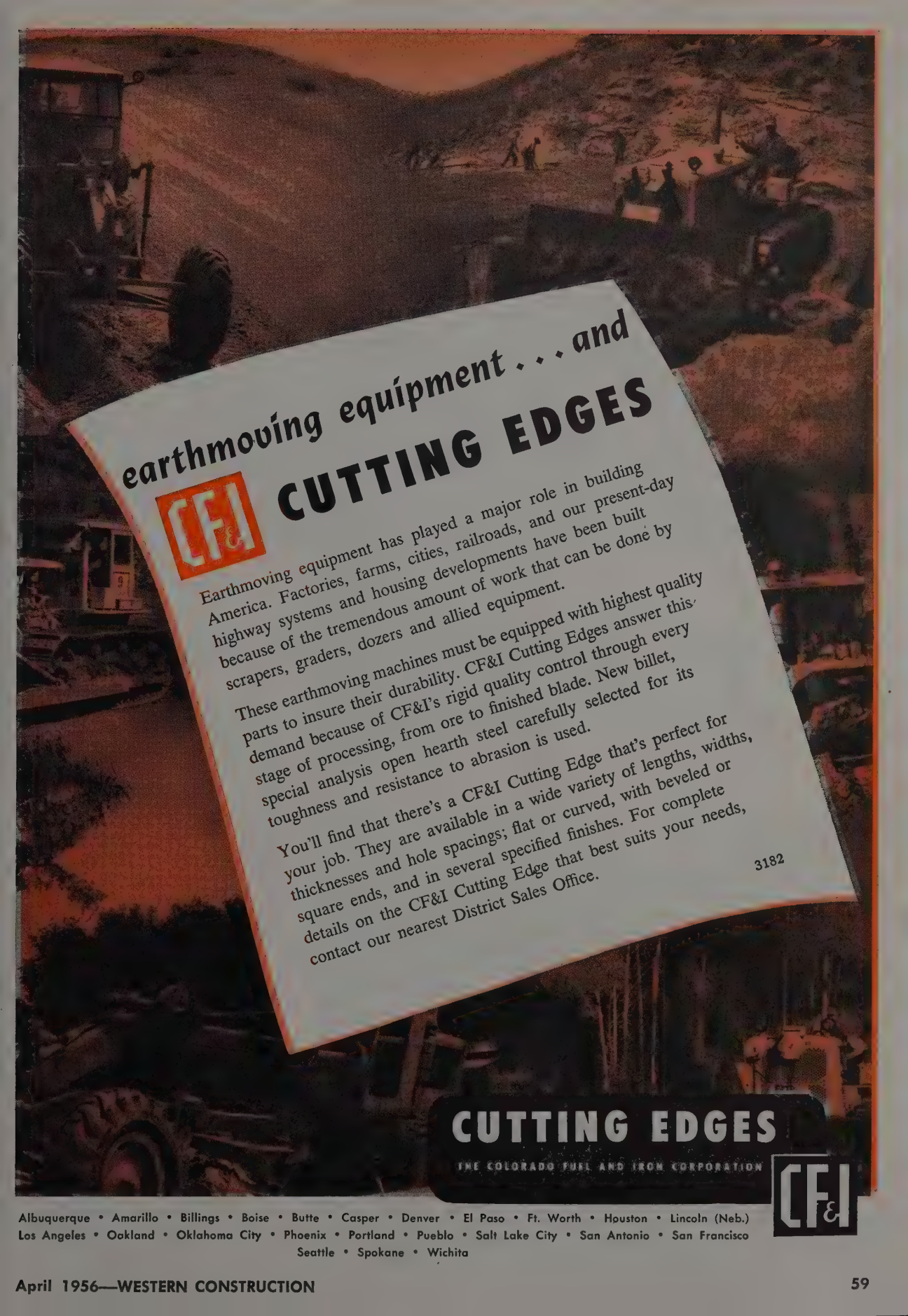
Backfill consists of 8 in. of sand under the pipe, imported sand up to springline which is jetted, then more sand to 1 ft. over the pipe which is jetted. Then excavated material is replaced to 5 ft. below the top of the trench and jetted. The last 5 ft. is native material put in place in 8-in. lifts and compacted by a 1/2 sheepsfoot pulled by a Caterpillar D6 in the wide trench and by a D4 in trenches which have between 36- and 54-in. pipe.

Quite a bit of pipe jacking has been carried out on this project. A total of 160 ft. of 75-in. pipe has been put in place by jacking and 96 ft. of 84-in. pipe, as well as several shorter distances on smaller pipe. For the 84-in. section it was necessary to build a pilot tunnel 6 ft. high, 5 ft. wide at the bottom and 3 ft. wide at the top, with shoring all the way. After a reinforced concrete invert was poured the pipe was jacked through with a 400-ton Rogers hydraulic jack.

The Los Angeles County Flood Control project is under the direction of resident engineer Walter Johnson. Alex Rados is superintendent for contractor Steve P. Rados, Inc., Clair Pelland is excavation and laying foreman, and Roy Grimwood is structure foreman.



ALEX RADOS (right) is superintendent; Clair Pelland (left), excavation and laying foreman; Roy Grimwood, structures foreman.



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Earthmoving equipment has played a major role in building America. Factories, farms, cities, railroads, and our present-day highway systems and housing developments have been built because of the tremendous amount of work that can be done by scrapers, graders, dozers and allied equipment.

These earthmoving machines must be equipped with highest quality parts to insure their durability. CF&I Cutting Edges answer this demand because of CF&I's rigid quality control through every stage of processing, from ore to finished blade. New billet, special analysis open hearth steel carefully selected for its toughness and resistance to abrasion is used.

You'll find that there's a CF&I Cutting Edge that's perfect for your job. They are available in a wide variety of lengths, widths, thicknesses and hole spacings; flat or curved, with beveled or square ends, and in several specified finishes. For complete details on the CF&I Cutting Edge that best suits your needs, contact our nearest District Sales Office.

3182

CUTTING EDGES

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Reservoir lining at Lower Stone Canyon features

Asphalt lining on 2:1 slope

By **LOUIS R. HOVATER**

Area Engineer
The Asphalt Institute

ADDING TO THE growing list of reservoirs that have asphalt linings in whole or in part is the recently enlarged Lower Stone Canyon Reservoir. Known previously as Stone Canyon Reservoir, the Los Angeles Department of Water and Power has increased its capacity to almost 10,000 ac. ft.

Stone Canyon Reservoir was originally constructed in 1924. An earthfill dam was built on the south end of the natural basin. The dam had a minimum height of about 160 ft. and a length of crest of 575 ft. The upper 60 ft. of the 2:1 slope of the upstream face of the dam was lined with 4 to 5 in. of asphaltic treatment consisting of alternate layers of light road oil and sand, the oil being depended upon to penetrate through the sand layers. While this type of lining is not recommended today, the lining was in good condition until the dam was removed during reconstruction of the reservoir.

The new earthfill dam has 3:1 and 2:1 slopes on the upstream face, a crest of about 1,600 ft. and an average height of about 180 ft. The upstream face has a 3-in. asphaltic concrete

porous lining with the underlying earth providing imperviousness. The lining consists of about 410,000 sq. ft. on the 3:1 slope and 30,000 sq. ft. on the 2:1 slope. To insure accurate grading for the pavement, the upstream face was overfilled 0.8 ft., compacted and removed to the required grade.

The asphaltic concrete mixture used consists of a hard paving grade asphalt (60-70 penetration) and a spe-



PACK OF cigarettes shows size of cardboard cylinder used to test porosity. Water is poured into the cylinder and checked for time required to disappear into the 3-in. asphaltic lining. About 2 min. is considered average. Another way to get an indication of porosity is to watch for runoff after spraying the lining with a fire hose. As yet no accurate test for porosity has been developed but research continues.

cially graded aggregate to provide porosity, usually one that will give 17% to 22% voids. Such a porous lining relieves back pressure and prevents upheaval of the pavement on drawdowns of water level. Water in the bank storage thus seeps back into the reservoir. The asphaltic concrete simply prevents erosion and gives a working surface needed during cleaning and maintenance operations. A sprayed coating was applied to the pavement surface to protect the asphaltic concrete from the surface tension of drying clay, silt, algae, etc. Consisting of a thin spray of neat portland cement mixed with 10 gal. of water per sack and 8% by weight of calcium chloride, the coating was applied at the rate of about 600 sq. ft. of lining per sack of cement. Based upon excellent service records, the Los Angeles Department of Water and Power considers this type of construction as standard practice. Ten other reservoirs, varying in size from 10 ac. ft. to 2,045 ac. ft., which are owned by the Department, have similar linings.

Because a rock and gravel strike in the Los Angeles area occurred at the time, commercially produced aggregate was not available for all of the asphalt mix. With the approach of winter and its accompanying rains, the Department of Water and Power

provided the contractor with a gravel pit located on City property near the hot-mix plant. The contractor set up a portable crushing plant and produced the needed aggregate to begin paving operations. When the strike was settled, commercially produced aggregate was used to complete the lining. The following gradation was specified and used:

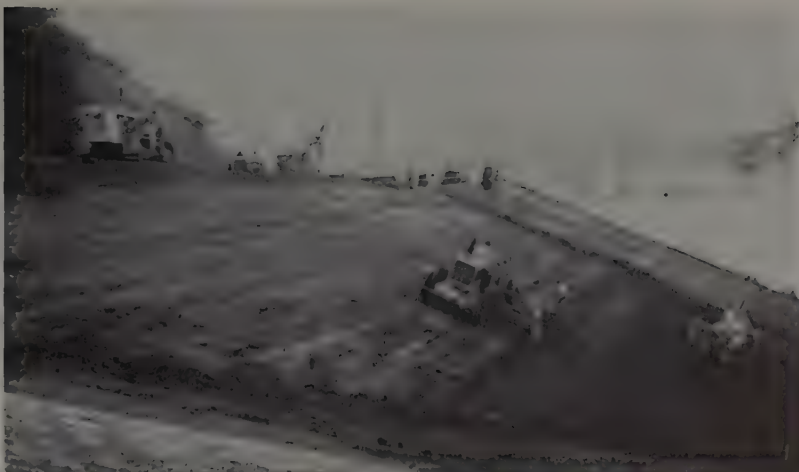
Sieve Number	Percent Passing
$\frac{3}{4}$ "	95-100
$\frac{1}{2}$ "	85-95
$\frac{1}{4}$ "	44-56
No. 10	25-35
No. 40	10-16
No. 80	3-9
No. 200	1-4
Asphalt (60-70 pen.)	4%-5%

A mechanical spreader was used for paving the 3:1 and 2:1 slopes. This is the second project in Southern California on which a typical highway paving machine had been used for paving slopes as steep as 3:1. The first project was Garvey Reservoir located in Monterey Park near Los Angeles, owned by the Metropolitan Water District of Southern California. However, the paving job at Lower Stone Canyon did attract some special attention—it was the first time a mechanical spreader had been used on slopes as steep as 2:1. In addition to providing partial compaction before the pavement was finished with a roller, the use of a mechanical spreader assured an even spread of the asphaltic concrete and thus increased the quality of the work and the quantity of lining placed during a work day.

Paving of the slopes required the use of three hoists on the dam crest, one for the trucks feeding the mechanical spreader, one for maneuvering the spreader on the slopes and one for the $4\frac{1}{2}$ -ton roller supplying the final compaction. A ramp for moving the spreader into a new position was not required because the pavement did not come to the top of the overfilled dam crest. The spreader was thus allowed to move over the unpaved portion to a new position on the slope. The overfilled dam crest was cut back later to a level below that of parapet wall at the pavement edge. In areas on the slopes inaccessible to the mechanical spreader and the $4\frac{1}{2}$ -ton roller, the material was spread and compacted by hand.

The hot-mix plant used is located 18 mi. from the project. The paving contractor used 16 trucks to haul the asphalt mix to a bunker at the job site. Four trucks were kept busy hauling from the bunker to the paver.

The reconstruction of Lower Stone Canyon was done by McCammon-Wunderlich Co. of Palo Alto, Calif., under \$1,334,000 contract. Southwest Paving Company of Sun Valley, Calif., was the paving contractor and supplied the asphaltic concrete. W. E. Hall Company, Monrovia, Calif., was the subcontractor on laying the asphalt lining.



GRADER removes overfill prior to paving. A Caterpillar tractor on the dam crest and cables is required to enable the grader to work on a 2:1 slope. The overfill, .8 ft., was placed and compacted on the upstream face and then removed to accurate grade.



AIR JETS are used to remove loose material from the subgrade prior to laying the 3-in. asphaltic concrete lining. This is the first project on which a mechanical spreader was used on a slope as steep as 2:1. A spreader increases quality and quantity of work and provides compaction.



CABLES for maneuvering the truck and the paver are clearly visible in this view, looking down the 3:1 upstream face of the dam. The roller at the right is used for final compaction. In areas inaccessible to the $4\frac{1}{2}$ -ton roller a small hand roller is used.



In California, this HD-16 and 315 scraper team—with another Allis-Chalmers torque converter drive tractor as pusher—are part of an Allis-Chalmers fleet moving four and one-half million cu yd on a housing project near San Francisco. With wide, low bowl design and offset cutting edge, scraper gets

heaping, void-free loads . . . makes most efficient use of tractor power to cut time and cost per yard. And owner Floyd Watson, Daly City, knows the output advantages of the HD-16 torque converter drive—how it exerts maximum pull at all times to get a full load.



Teamed to increase output ...keep jobs on the move

Allis-Chalmers HD-16 crawler tractor and 315 pull scraper offer a combination of advanced design features that cut cost and time per yard

Here's more of everything you want in a tractor-scraper team to keep producing more on your jobs. Allis-Chalmers HD-16 and 315 give you output with dependability . . . long life with minimum servicing. These

profit-making benefits work for you on every job—road building, housing development, land leveling, stripping. Read how these big-volume earth movers can help you cut cost and time per yard . . .

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A. H. Cox & Company—Seattle
American Machine Company—Spokane
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WYOMING

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HD-16

with hydraulic
torque converter drive
150 net engine hp
31,600 lb

with standard transmission
141 belt hp
31,500 lb

AC-315

15 cu yd struck
20 cu yd heaped
25,850 lb
cable-controlled



◀ **In Washington**, R. E. Bowen, of Moses Lake, uses his HD-16 crawler and 315 scraper to level land for irrigation at Warden. The HD-16's Allis-Chalmers diesel engine with follow-through combustion provides real lugging ability . . . has power to load the last few yards of tough, hard dirt. The 315's wide bowl permits wider wheel tread, yet keeps all wheels inside cutting edge for fast, smooth loading.

▲ **On a housing project**, this HD-16 and 315 team hauls loads like this on cycle after cycle. It's a long-life pair, too. The HD-16 has an all-steel, box-A main frame to soak up shocks and protect drive train . . . 1,000-hour lubrication intervals of truck wheels, idlers and support rollers eliminates daily maintenance—adds 30 minutes to every working day. The 315 scraper's loaded weight is distributed equally on all four wheels for longer tire life.

Manlift speeds work on powerplant

Men move from floor to floor on endless belt at 75 ft. per min.—Safety and efficiency proved by more than 3 years of use.

designed and fabricated by the Stephens-Adamson Mfg. Co. of Los Angeles from specifications and ideas furnished by the department personnel. Before actual design was started the State of California elevator safety people were consulted and valuable instructive information was given by them as to general arrangements they would approve and safety requirements. With recommendations from the state and, with specifications provided, Stephens-Adamson fabricated the manlift.

Design provides a one-man step, mounted on an endless belt, with a travel speed of 75 ft. per min. It is approximately 126 ft. high with the top landing at elevation 118 ft. above the basement floor. There are 22 steps mounted on the 16-in., 6-ply belt, spaced so that the supporting handholds work for each step in either the up or down travel. The steps and the handholds are bolted to the belt.

The manlift is located at a convenient point on the outside of the building, attached to the building itself. It is enclosed on three sides with the open side to the building. The size of the openings in the landing platforms which the belt travels through are regulated by the State of California codes and are large enough to comfortably pass a large person.

On the underside of each platform, on the up travel, there is a funnel-like sheet metal hood, so attached that a man will be guided through and not be able to catch his head or arms on the landing.

This lift has been in continuous operation for more than three and one-half years with several hundred thousand man travel units, without a single accident. The construction personnel take to the manlift very readily and after one or two trips on the belt it is taken as a matter of course. With the employment of over 600 men no one has refused to ride the belt. There were two men who, at first, hesitated to get on the belt at the beginning but after climbing steps for several days and seeing how readily others took to riding the belt they themselves began to use and ride the belt with no coercion on the part of the foremen.

(Continued on page 66)



By M. HJALMARSON
General Superintendent
of Construction
San Diego Gas & Electric Co.

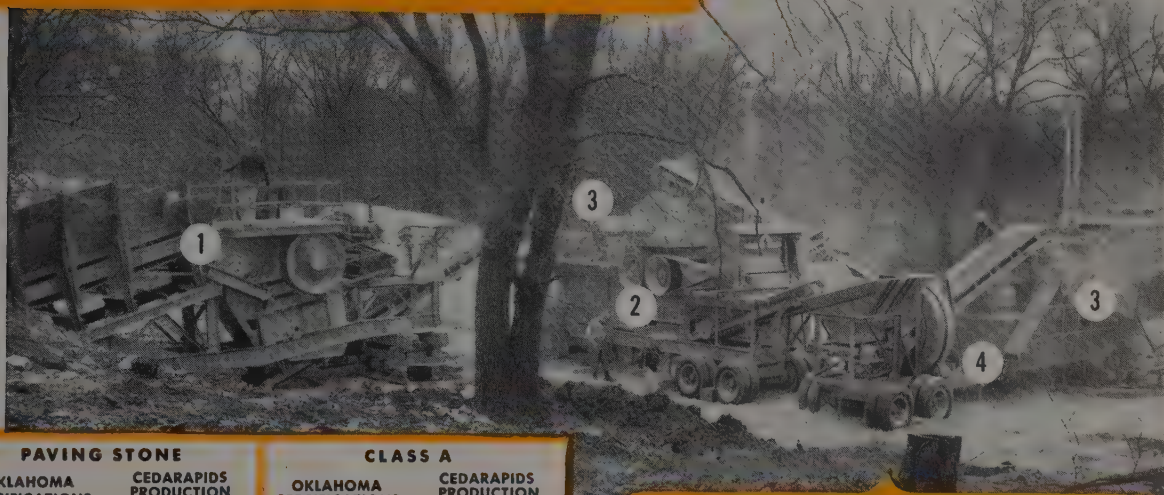
A MANLIFT has been developed and used for more than three years by the San Diego Gas & Electric Co. in powerhouse construction for elevating personnel from floor to floor on these multi-storied projects. The

basic idea of a manlift has been used, previously, in flour mills and in some public parking garages, but as far as can be determined this device has never before been used on construction jobs. The manlift is now being used for the second powerhouse project and has proven to be of considerable savings in time and energy for workers.

The manlift used by the construction department of the utility was

"Here's the plant that hits specifications easier and closer than any other plant we've ever operated . . ."

says **STREET BOYD**,
of **STEINBERG-BOYD**
CONSTRUCTION CO.
TULSA, OKLAHOMA



PAVING STONE

OKLAHOMA SPECIFICATIONS	CEDARAPIDS PRODUCTION % PASSING
100% passing 3"	100%
95-100% passing 2"	97.7%
70-95% passing 1½"	85.1%
50-85% passing 1"	61.7%
----- passing ¾"	34.6%
15-40% passing ½"	19%
----- passing ⅜"	10.6%
0-2% passing No. 4	1.9%

CLASS A

OKLAHOMA SPECIFICATIONS	CEDARAPIDS PRODUCTION % PASSING
100% passing 1½"	100%
90-100% passing 1"	95.9%
----- passing ¾"	70.7%
25-60% passing ½"	29.7%
----- passing ⅜"	12.4%
0-5% passing No. 4	1.4%

"... and we're getting 180 to 250 TPH in Paving Stone, 140 to 160 TPH in Class A from our new Cedarapids Portable Crushing Plant."

You can hit specs right on the nose, too . . . out-produce any comparable plant . . . and do it at the low production costs that step up your profit. That's some of the reasons Steinberg-Boyd is so well satisfied with their new Cedarapids Unitized Portable Crushing Plant. It consists of a 2540 Portable Primary, an 1836 Twin Jaw Scalping Unit and the brand new Cedarapids Model 30C Secondary Plant featuring the Symons Cone Crusher. It's a plant designed to meet the big output and exacting gradation demands of modern turnpikes and toll roads.

Best of all, this set-up has all the features that *make money for you on every job.*

THESE EXCLUSIVE CEDARAPIDS FEATURES ASSURE BETTER GRADATION BIGGER PRODUCTION LOWER OPERATING COSTS

1. VIBRATING GRIZZLY

... by-passes most of the undersized material and fines. Increases primary output up to 25%.

2. TWIN JAW CRUSHER

... increases primary crushing production up to 40% over single jaw units and is especially efficient in abrasive rock or gravel.

3. HORIZONTAL VIBRATING SCREEN

... steps up screening capacity because the horizontal position of the screen cloth gives 12½% more screening area than an inclined screen of the same length.

4. SYMONS® CONE CRUSHER

... produces high tonnages of uniform, fine-crushed aggregate, even in the hardest or most abrasive rock or gravel. The Symons Cone Crusher, built by Nordberg, and world famous for big-volume, low-cost operation, has been combined with Cedarapids mobility and quality construction to give you a portable plant with the high-profit features of a permanent installation.



IOWA MANUFACTURING COMPANY

Cedar Rapids, Iowa, U. S. A.

Strict rules are set up and maintained in the use of this manlift. No one is permitted to indulge in any horseplay or to carry tools or material on the lift. There has been no trouble in enforcing these rules. A material elevator located next to the manlift permits a workman to load his tools or the material and, after signaling the operator the level he wants the material to go to, either up or down, he himself steps on the manlift belt and arrives at the landing at approximately the same time as the elevator.

The belt is driven by a 5-hp. motor through a reduction gear. There is a safety rope on both sides along the frame of the belt which activates a cut-off switch. By pulling on this rope in the direction of travel the belt can be stopped.

Another safety feature is a cut-off switch 6 in. above the top landing which is activated and stops the belt by pressure exerted against the switch from the weight of the man on the step. In this way, should a man forget to step off at the top landing the belt automatically stops. There is another safety switch at the top of the manlift where the step begins to break over the head pulley. This switch is activated by a butterfly flap which projects toward the belt in such a way that should a man pass the first safety switch he will strike his head on this light flap, which cannot hurt him, and stop the belt. This leaves him only 2 ft. above the landing so that he can easily get off. In this way should the first safety switch fail, he is protected by the second switch.

When the belt is stopped by either of these switches it cannot be started until the man is off the belt and he, or someone else, turns the switch back on. This starting arrangement was designed so that a man on the belt must get off to reach the starting button.

The following items might be listed as advantages in the use of a manlift for construction purposes.

1. Safety.
2. No waiting at landings as a step will pass any given landing in less than 5-sec. intervals. The belt runs continuously during the day.
3. A man can travel either up or down, arrives at his destination quickly and is not tired on arrival.
4. Convenience. Because it involves little physical effort a man does not hesitate to go up or down to arrange for tools or material at any time of the day.
5. Saves energy. A man is not tired from climbing stairs and is ready to go to work upon arrival.
6. During morning and noon hours, when men go to work, it provides rapid transportation to the various parts of the building.
7. Original investment is small.
8. Low cost of operation as no operators are required.

LIFT-SLAB

(Continued from page 56)

pany—slabs are prestressed by the post-tensioning method prior to lifting. The prestressing technique is particularly useful to control deflection and inhibit cracking in relatively long spans with minimum slab section and weight.

Lifting equipment and safety

In the lifting process, a 50-ton hydraulic jack is mounted at the top of each column. Spooled lifting rods, coupled in 5-ft. lengths, are connected to lifting collars embedded in the slabs to be raised. As each 5-ft. length passes through the jack, it is readily removed, thus eliminating some problems of shoring and the delays occasioned by installing shorter rods on high lifts. Air from a portable compressor supplies an air motor which actuates the hydraulic ram. An electronic control panel furnishes automatic control of the operation of each jack. This unique control system is so devised that the slab elevations at all of the columns in a slab unit in process of lifting cannot vary more than $\frac{1}{4}$ in. from the mean.

The system also embodies a highly important safety feature. An automatic shut-off control operates when overload occurs at any jack. These controls eliminate the necessity for continual monitoring and insure against serious consequences which might stem from human error.

There are other points of interest in this lifting system. The automatic control features permit a rapid rate of lifting without inducing safety hazards. Also, a separate pump and oil reservoir accompanying each jack unit makes it unnecessary to employ high-pressure hydraulic lines and



WELDERS make the final connection between slab and columns. Shear plates are shown. The control system was devised to maintain not over a $\frac{1}{4}$ -in. difference in elevation of the slab at all columns during the lifting operations.

guards against the nuisance of oil leakage.

The bid price for the automatic lift control system was lower by approximately 30% than that for manually controlled lifting.

Personnel

For the owner, County of Sacramento, Harry J. Devine of Sacramento is architect; the Structural Engineer is Ernest D. Francis of Sacramento. General contractor is Stolte, Inc., of Oakland. Representing this contracting firm, Don Mahony is area manager and Bob McClesney is project superintendent.

The subcontract, involving the slab lifting only, was performed by Western Concrete Structures Co. of Los Angeles. Partners in this firm are Allan H. Stubbs and Edward K. Rice, specialists in lift-slab and prestressed concrete construction.

Letters...

Continued compaction interest

SIR:

I have reviewed with some interest the article on vibratory compaction which ran in your December issue.

There is little doubt that vibration in the proper frequency can add to compaction. Results in granular soils, of course, appear to be the best, and in this type of soil the sheeps-foot roller does not turn in the best results.

In general, it would appear that a great deal more needs to be known before the system can be properly evaluated because, in the final analysis, the true measure will be the unit cost of compacting a yard of earth to the contractor and finally to the organization for whom the work is being accomplished. To say simply that a vibratory roller can do the same

work in two passes that a sheeps-foot roller does in six, is not a real measure. The width of the pass made by the roller, the depth of material and the forward speed of travel all must be considered in arriving at the hourly compaction rate.

The next step is to evaluate the cost of purchasing, owning, and operating the tractor and the two types of compaction equipment. Assuming, for instance, that vibratory compaction could take place at twice the hourly rate and, at the same time, cost twice as much to own and operate, this would leave the contractor in a position of selecting equipment due entirely to so-called side benefits. Where traffic on fills is a problem and a high production must be main-

(Continued on page 105)

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40,125 lbs. — 190 h.p.



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Is that road public or private?

A legal discussion of the difference between highways accepted by public authorities, and a private way used by the owner and those with contract or easement rights.

ALL WAYS are either public or private.

A way open to all the people is public, and, in law, is termed a highway whether called a road, street, avenue, boulevard, or place. The term "highway" is the generic name for all kinds of public ways in which the public has a right of way or passage.

Most public ways or highways have been accepted by the government—either federal, state, county, or city. However, there are other public ways or highways over which government has not accepted responsibility. Both types of public ways have one thing in common: the public has a right of travel over them.

A private way is private property. It is used by the owner for his own purposes and may also be used by a limited number of others who have special contract or easement rights. The most famous private way in California is probably the scenic "17 Mile Drive" on the Del Monte properties in Monterey County.

Therefore, we can classify the ways in the State in the following categories: private ways, public ways not accepted by public authorities, and public ways accepted by public authorities (i.e., state highways, county highways, city highways).

Private ways

The counties cannot expend public funds on private ways. Such expenditures would be a gift of public funds for a private purpose and a violation of the Constitution.

Under Streets and Highways Code, Section 942, the board of supervisors by a four-fifths vote may let to private individuals county equipment used in the maintenance and construction of county roads when the use of such equipment is not required by the county. The attorney general has construed this section as permitting the renting of county equipment to private individuals to be used for private purposes and that the section also includes permission to rent an operator with the equipment.

This section does not include the right to furnish paving or other materials which might be required in the repair of the private road. Neither does this section appear to authorize the county to contract with a private individual to maintain a private road with county equipment,

when, as, and if such equipment is not required for use by the county. Such an agreement would contemplate determination by the county of the type and frequency of the maintenance.

The intent of the statute is that the equipment and the operator, if one is supplied with the equipment, be rented for a specific period of time and be under the supervision and control of a private individual during the period for which it is rented and not under the control of the county.

The first paragraph of Section 969.5 of the Streets and Highways Code refers to privately-owned roads and improvements by the county. It reads:

"Such boards may, after they have determined by a resolution adopted by a four-fifths vote of their membership that general county interest demands the improvement or repair of a privately-owned road, improve or repair such road in consideration of the grant or lease of a right-of-way to the county for its own use or the use of the State, any political subdivision or other appropriate public agency for the public purposes specified in the resolution."

This section appears to authorize the county to do work on a privately-owned road in consideration of the grant or lease of right-of-way, whether for highway or other purposes, to the county or other designated public agencies. The last paragraph of the section states: "Proceedings under this section shall not cause the road to become a county highway." It is important to note that this section can only be exercised when the board of supervisors, by a four-fifths vote, finds that the improvement is of "general county interest." The county is in effect purchasing a right-of-way by agreeing to repair or improve a private road. If the right-of-way is for a drainage channel, for example, the road remains a private way. If the consideration is for a highway right-of-way, the road becomes a public way.

Query: Must it become a county highway? Since a prerequisite to the exercise of the powers under the first paragraph of Section 969.5 is the enactment of a resolution by a four-fifths vote finding that the improvement and highway right-of-way is of general county interest, it follows that such a right-of-way should be established as a county highway.

Section 941 provides that the board of supervisors shall by proper order cause those highways which are "necessary to public convenience" to be established. A road of "general county interest" is certainly included within the term "necessary to public convenience."

The term "private or by-road" is referred to in Sections 1128-1133 of the Streets and Highways Code. Prior to 1955, this procedure was limited to establishment of roads for timber access purposes. This limitation has now been removed. The term "private" is a masquerade. These are public roads, and maintenance is placed on the person for whose benefit the road has been opened.

Public ways not accepted

The term "public way" is used here to describe those ways over which the public has a right of travel but which have not been accepted by public authorities. These are sometimes called "undedicated public roads"—although this is an inaccurate description. County highways are, of course, public ways. But in this discussion the term "county highway" is limited to those ways accepted by the county. It is important to remember that all public ways need not be county highways, state highways, or city streets.

How public ways are established

Public ways are established by dedication. To effect a dedication of lands by a private owner for public use, it is essential that there be an unequivocal offer of dedication by the owner, and an acceptance of the offer by the public. No particular formality is necessary, the offer to dedicate by the owner and the acceptance by the public may be manifested in innumerable ways. There is no statutory procedure, but common law principles are followed.

The intention of the owner to set apart land for use of the public is the foundation of every dedication. It is not a trivial thing to hold that private property has been dedicated to public use. The intention must be manifested by his acts and find expression in his conduct. While the intention may, of course, be shown by written instrument, it need not be expressed in writing; it may be implied from conduct or presumed through acquiescence of the owner in the public use for sufficient period of time.

Where the common law dedication of land for public use is grounded on public user, it is generally difficult or impossible to differentiate clearly between user as evidence of an offer of dedication and as evidence of the requisite public acceptance.

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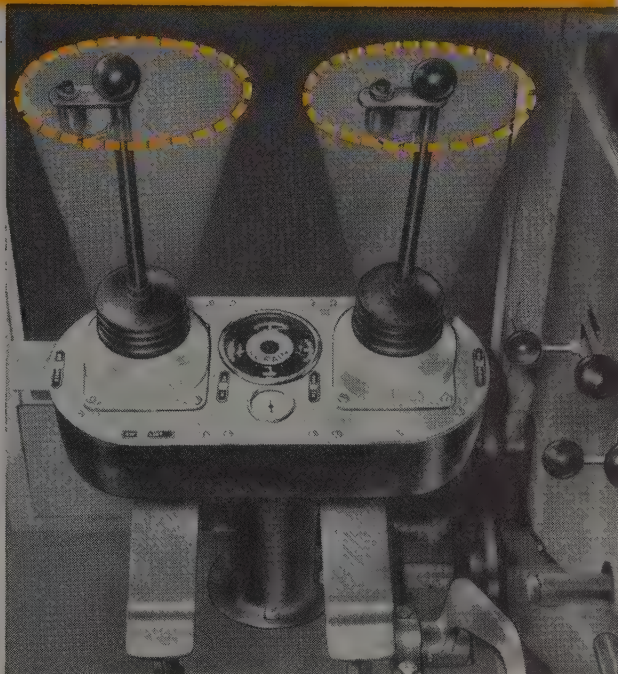
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To be the first to put the new 2-lever "Air-Ease" control to work on your jobs, see your Thew-Lorain Distributor. Here is a feature your next shovel-crane should have!



LEFT LEVER — Yellow circle indicates the "wobble stick" action. By positioning lever in various directions within this circle, operator can swing the turntable right or left, or raise the boom up or down. Intermediate positions within the circle combine any of these operations.

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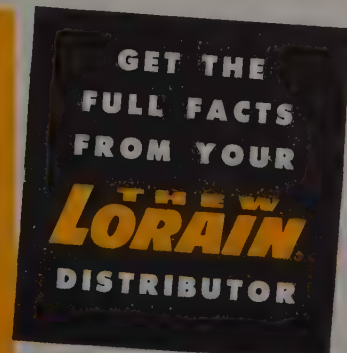
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Section 904 of the Streets and Highways Code, which reads "no route of travel used by one or more persons over another's land shall become a county highway by use," does not prevent a common law dedication through public user where all the elements essential to an offer by the owner and acceptance by the public are established. Neither must the way meet the requirements of width required of county highways.

Many county highways in this state, starting, perhaps, as mere trails, became public ways without any formal or express dedication, but by long uninterrupted use and general acquiescence. When the public, or such portion of the public as had occasion to use the way, traveled over it, with full knowledge of the landowners interested, without asking or receiving any permission and without objection from anyone for a period of time beyond that required by law to bar a right of action, a right in the public to use the right-of-way arose by implied dedication. Later, these public ways have been recognized as necessary to the public convenience and accepted by public authorities.

Does acceptance by the public create liability for the county?

Whether public user imposes liability for care and maintenance on the county is disputed by the courts in other states. In some states, the rule is that public user, in addition to constituting acceptance of a dedication, will not be sufficient to impose liability on public authorities for care and maintenance. This is obviously so where statutes require acceptance by the public authority. In other jurisdictions, it is held that public user imposes a burden of maintenance and care on public authorities. In these states, liability is imposed on the government upon the theory that it would be inconsistent to permit public user to establish a right against the land owner, but not to permit members of the public to claim a right against the governmental body. They hold that the general public, being principals, may accept the dedication without action by the elected officials, who are merely their agents.

The ground of the decisions to the contrary is that although elected officials are merely agents of the public, they are the only means by which the public may act; and to permit a small segment of the public, by use of a private way to impose the burden of maintaining it upon the general public would be in dereliction of the powers of elected officials, and permit the establishment of public roads in undesirable places. These cases generally require that there be some official action consistent with an acceptance of the dedication before public authorities must accept the burden of maintenance.

The California Supreme Court, in the important decision of *Union Transportation Company vs. Sacramento County*, reviewed these two conflicting opinions and supported the view that acceptance by the general public by use does not create liability for care and maintenance on the county because of consideration of public policy. The public policy being that public authorities should determine which roads are of general public convenience and therefore to be maintained by public funds.

Union Transportation Company vs. Sacramento County is a landmark decision. The case involved a question as to whether a dirt road, of which a defective wooden bridge was a part, although originally a private road, had become a public highway by implied dedication arising from long acquiescence on the part of the adjacent land owners in its use by members of the public, so as to place a duty upon the county to maintain it. The dirt road in question had, for many years, been used by the ranchers in the vicinity and their friends to provide access to a U. S. highway. Also, various members of the public traveled over it, generally about once a week, but occasionally as frequently as 20 times a single day. The defective bridge was located in El Dorado County, and the principal issue involved the liability of El Dorado County under the Public Liability Act of 1923. There was evidence that El Dorado's superintendent of roads dispatched road equipment to the section of road in question with instructions to the operator to make repairs on it.

The record shows no repairs were made. This act of dispatching the road equipment was the only evidence that the offer to dedicate, which offer the Court inferred from the long continued public use, was accepted by El Dorado County.

The rationale of the case is that no formal act of acceptance by public authorities is necessary, that any action of a responsible public official showing an assumption of control over the road is sufficient recognition of the road as a county highway. And although the record shows that no repairs were made, the action of the superintendent in assuming control of the road reasonably supports an inference that the county impliedly accepted the dedication.

The case is extremely far-reaching. Although the court said that it favored the view that acceptance by the general public by use cannot create liability for care and maintenance of public ways by the county, it found that the county by merely dispatching of road equipment by the superintendent of roads, with instructions to the operator to make repairs on the road, is sufficient assumption of control to constitute acceptance, even though no repairs were made.

The court's holding that such an informal assumption of control indicated county acceptance of the highway placed the county in about the same position as courts have placed counties in those states which have adopted the rule that mere public user imposes a burden of maintenance and care. Therefore, at the 1955 Session of the Legislature the counties secured an amendment to Section 941 of the Streets and Highways Code which now reads: "No public or private road shall become a county highway until and unless the Board of Supervisors, by appropriate resolution, has caused said road to be accepted into the county road system; nor shall any county be held liable for failure to maintain any road unless and until it has been accepted into the county road system by resolution by the board of supervisors." Formal acceptance of public ways by the board of supervisors is now required to create a liability for care and maintenance of public ways by the county.

Work on public ways not accepted

Neither general county funds nor gas tax funds may be expended for the purpose of maintaining public ways not accepted by the county. The obligation and duty to maintain and repair these public ways remain on the owner of the fee.

The first paragraph of Section 969.5, discussed above under Private Ways, is not applicable to public ways. Since the public has already acquired a right of user, the county would obtain nothing by reason of the granting of an easement where the right-of-way to be conveyed consists of the land upon which said roads is located.

The second part of Section 969.5 is applicable to public ways and not to private ways. It reads: "By the same authorization the Board may rent to the owner of land over which such a road has been opened to the public for more than five years the machinery and equipment necessary to repair such road and the approaches thereto and any protecting embankments there may be, charging therefor by way of rental the cost of labor and other necessary expenses in addition to a reasonable allowance for depreciation of machinery."

This refers specifically to roads used by the public for more than five years, but not accepted as a county highway and to that type of road only. County equipment may be used on such roads if the owner of the land over which the road passes pays the cost of labor and other necessary expenses which would include materials together with a depreciation charge on the equipment used. That the Legislature had this in mind is quite evident when the paragraph is read in its entirety, for in the first part authority is given to

(Continued on page 108)



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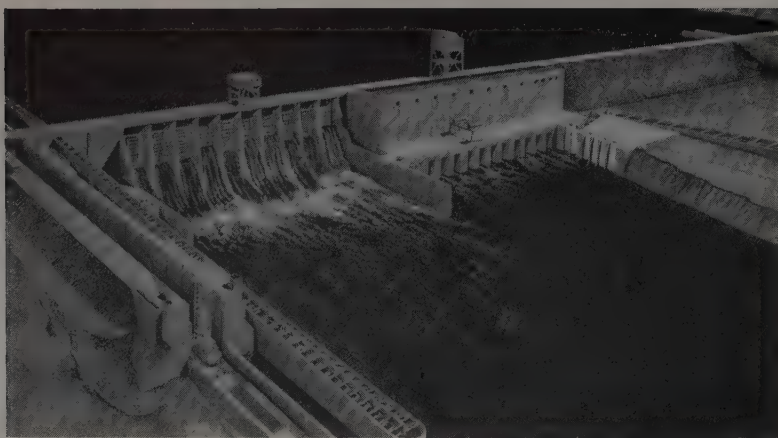
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Finally, after 22 years —

Green light on Ice Harbor

AFTER A FIGHT for funds which dates back to 1934, \$1,000,000 has been appropriated for the start of construction of Ice Harbor Dam in Washington. According to present plans power from the dam, the first of four planned for the lower Snake River, will be available in 1961. The allocation makes possible the following construction:

Lands and damages	\$ 75,000
Turbine contract	10,000
South shore access road	95,000
Surfacing south shore road	55,000
First step cofferdam which includes:	
Grading unloading spur track	} .. 100,000
Spur track road	
North shore access road	
Track laying on railroad unloading spur	20,000
Supply contract — Steel sheet piling	120,000
Resident Engineer's Office	31,000
SUB TOTAL	\$506,000

The balance of the appropriation would be utilized in preparation of plans and specifications, preparation of supply contract specifications, and general administrative expenditures.

During fiscal year 1956, it is proposed to construct access roads, temporary unloading spur track, and field office, and award contracts for three 143,000-hp. turbines. Also to begin construction of first step cofferdam—acquire site lands and perform engineering design work for future construction.

During fiscal year 1957, the proposed schedule includes continuation of contracts on the first step cofferdam and turbines; initiation of generator contract; develop project utilities and construction of field buildings; continuation of land acquisition for reservoir and relocations; and the preparation of designs, plans, and specifications for a major contract within the first step cofferdam.

The 1958 fiscal year schedule includes initiation of a major construction contract for the work within the first step cofferdam including the dam itself, powerhouse, fish facilities, and access railroad to the powerhouse. This contract will continue through fiscal year 1959 and into first part of fiscal year 1960 at which time another major contract will be initiated for the work inside the second step cofferdam. This work will include a portion of the spillway, navigation facilities, north shore fish facilities, and non-overflow dam, scheduled for completion about the middle of fiscal year 1962. Simultaneous with work in the second step cofferdam installation of powerhouse turbines and generators will be carried on and miscellaneous electrical power plant equipment will be installed in the powerhouse.

The project as scheduled will permit raising the low spillway bays during the low water period from August through October of calendar



PROJECT ENGINEER is C. C. Davis who has been with the Corps for 28 years. He was resident engineer at Detroit Dam and Lookout Point Dam. He was assigned to the Walla Walla District in July 1955.

year 1961 with subsequent raising of the pool in November 1961 for navigation and power production in December of calendar year 1961.

It is impossible to estimate the number to be employed each year at this time.

The following data are pertinent to the Ice Harbor Lock and Dam:

General:

Maximum height	
(headwater to tailwater)	101 ft.
Over-all length, elevation 453	2,788 ft.

Reservoir:

Length at normal pool	35 mi.
Area at normal pool	9,200 ac.

Spillway Dam:

Length over-all	600 ft.
Maximum height	
(foundation to deck)	146 ft.
Type of control	Tainter gates
Number of gates	10
Size of gates	50 x 52.5

Powerhouse:

Over-all length of powerhouse	595 ft.
Width of powerhouse over-all,	
including intake	250 ft.
Main unit generators	90,000 kw.

Navigation Lock:

Type	Single lift
Maximum lift	101 ft.
Net clear length	540 ft.
Net clear width	86 ft.

Nonoverflow concrete dam:

Section 1—Spillway to lock with stoplog storage pit	
Length	169 ft.
Deck elevation	453 m.s.l.
Maximum height	
(foundation to deck)	143 ft.
Section 2—Spillway to powerhouse	
Length	41 ft.
Deck elevation	453 m.s.l.
Maximum height	
(foundation to deck)	131 ft.

Left abutment:

Section 1—Concrete gravity section including intake gate storage pit	
Length	221 ft.
Deck elevation	453 m.s.l.
Maximum height	
(foundation to deck)	120 ft.
Section 2—Embankment	
Principal materials	
Rockfill with impervious core	
Foundation for cut-off	Rock
Length	400 ft.
Crest elevation	453 m.s.l.
Height at maximum section	110 ft.
Crest width	30 ft.
Side slopes	1 on 2.5

Right abutment embankment:

Principal materials	
Rockfill with impervious core	
Length	597 ft.
Crest elevation	453 m.s.l.
Height at maximum section	130 ft.
Crest width	30 ft.
Side slopes	1 on 2.5

Fish Facilities:

Ladders	
Number	2
Width	24 ft.
Slope	1 on 16
Attraction water supply, north shore 3 pumps	
Attraction water supply, south shore 8 pumps	

The U. S. Air Force and the AGC

Here are the highlights of the recent talk given by General Washbourne to members of the AGC. In addition to the important question of whether to use concrete or asphalt for airport pavement, General Washbourne discusses the scope of the Air Force construction program and the seven kinds of construction contracts.

APPROPRIATIONS for base construction are made by the Congress direct to the Air Force, and the basic responsibility for these funds is with the Air Force. We want you to know of our interest in how our Air Force construction funds are expended, and we want to learn if the contractors are dissatisfied with Air Force policies which control its construction program. Lest some of you wonder how this all fits in, let me identify myself further. As Assistant Chief of the Air Staff for Installations, the functions of my office are roughly comparable to those of the Chief of Engineers of the Army and the Chief, Bureau of Yards and Docks of the Navy. At Air Force headquarters, a staff of 630 persons, military and civilian, develops and executes departmental policy with respect to its base construction. Installations representatives are stationed with each division engineer. Air Force personnel in the business of planning, programming, building, operating, and maintaining bases are collectively known as installations engineers. Though operational requirements are generated by Air Force commanders, it is our technical responsibility to secure authorizations for construction from the Congress, and arrange for proper channels through which construction funds are passed to you contractors.

Scope of program and kinds of construction

The scope of the Air Force construction program is perhaps not well known. We recognize our very great responsibility in having received approximately two-thirds of all funds for military construction during the past several years. That division will continue in the fiscal year 1957 now approaching. Authorizations granted by Congress since 1950 for Air Force construction will, through 1957, amount to almost \$10,000,000,000, against which the Congress will, in the same period, have appropriated approximately \$8,000,000,000 in construction funds. Contracts awarded now amount to approximately \$6,500,000,000, and completed work is something over \$5,000,000,000 at the end of calendar year 1955. Although the Air Force expects to complete the essential

operating bases for its 137-wing force structure at the end of fiscal year 1957, there is reliable indication that the development of new military armaments and other technological advances will continue a program of the present magnitude for the next 3 to 5 yr.

I think the Associated General Contractors will be interested to know that there are approximately seven kinds of Air Force construction contracts: (1) those for master planning and base development amount to approximately \$15,000,000 a year, and are handled by the major commands and Air Force bases; (2) design contracts are administered primarily by the construction agencies (that is, the district engineers), and \$60,000,000 a year would be a rough approximation of basic design costs; (3) the third and largest category of Air Force construction contracts are those for new work. These are, as I mentioned earlier, mostly handled by the construction agencies, and \$1,000,000,000 a year would approximate their value; (4) the fourth category of Air Force construction contracts concerns those for major repairs, minor construction, and contract maintenance. These are primarily handled by commands and bases, and amount to \$75,000,000 per year, mostly in smaller contracts; (5) this class I will term "excepted work," handled directly by Headquarters, by the Air Materiel Command, and by Air Research and Development Command. Their present scope is nearly \$500,000,000, with such projects as DEW Line, the SAGE system, the Air Force Academy, and weapons research facilities falling into that category; (6) the sixth and perhaps smallest group of construction contracts are for investigational engineering and research. These average \$5,000,000 per year, and are handled by the construction agencies; and (7) the seventh and last category of Air Force construction contracts is that for family housing. This program actually uses two kinds of funds, appropriated Government funds, and private capital. Present hope, if not expectation, is that 90% of this program will be provided from private capital under new Title VIII of the National Housing Act. These contracts are handled

by the Air Force through its commands and bases. The remainder of the housing program, approximately 10% at the present time, uses appropriated funds; most of these projects are handled by the construction agencies. The Air Force requirement for private capital in family housing is about \$700,000,000. It is estimated that \$400,000,000 will be required to meet essential requirements in calendar year 1956, and that a slightly smaller amount will be required for projects being made ready for next year.

Definitive designs used

In the Air Force construction program, the Air Force usually expresses its construction requirements in the form of definitive designs. These definitives are transformed into working drawings by the construction agencies, and I presume that you know how to suggest alternates in these requirements at the time you submit your bids, or as the work progresses. In a few cases, the Air Force participates in the use of standard Department of Defense designs, particularly for hospitals, but generally does not favor this practice. It is convinced that the definitive system now in effect should be continued, and high-quality materials and workmanship taken for granted.

Concrete versus asphalt

The Air Force is aware that one of its current problems is of great interest to the contractors of the United States. That problem is pavement criteria, i.e., whether to build portland cement concrete pavements or asphalt concrete pavements, or to continue the practice of allowing contractors to bid either one to meet Air Force requirements. When the Air Force began to operate jet-propelled aircraft approximately 5 yr. ago, it was immediately apparent that operational problems would result from jet blast, fuel spillage, and extremely heavy aircraft weights on high-pressure tires. The extent of this problem was not underestimated. Weights of new aircraft coming into inventory are already approaching 500,000 lb., and the operational problem of moving this weight thousands of times with bicycle-type gear over the same area of pavement has not been solved. Associated with this problem was that of tailor-made bases, which were suitable for the minimum mission but could not accommodate different types of aircraft, or advanced aircraft now coming from industry. This limitation prompted the Air Force, approximately 2 yr. ago, to abandon the tailor-made base and construct

(Continued on page 104)

ARIZONA

RECENT MAJOR CONTRACT AWARDS and low bids in Arizona include a low bid of \$289,619 submitted by Royden Construction Co. of Phoenix for grading, draining, and incidental work in Mohave County. A low bid of \$109,352 was submitted by Hagen Construction Co., Globe, for grading and surfacing in the city of Globe. Johnnie Iben Construction Co., Phoenix, submitted a low bid of \$175,478 for grading and draining near Congress. A low bid of \$75,781 was submitted by W. R. Skousen Construction Co., Mesa, for grading and surfacing approximately 1 mi. in Pinal County. Mohamed Earthmoving Contractor of Phoenix submitted a low bid of \$63,160 for grading and surfacing in Maricopa County. A low bid of \$1,012,097 submitted by Euclid Construction Co., Phoenix, for Palo Verde Diversion Project, Arizona-California. A low bid of \$80,324 was submitted by Flickinger Bros. Contracting Co.,

Phoenix, for grading and surfacing the Phoenix-Yuma highway. Sundt Construction Co. of Tucson received a \$2,649,957 contract for apron runway extensions, Davis-Monthan Air Force Base in Tucson.

CALIFORNIA

THE CALIFORNIA Highway Commission has allocated a total of \$11,653,905 for reconstruction and replacement of flood-damaged highways and bridges. The estimate is based on surveys which in some cases consisted only of aerial reconnaissance of the damaged sections. State Highway Engineer G. T. McCoy informed the commission, however, that resurveys of the damaged highways and bridges are still being carried out. On those routes which are eligible for Federal Aid, engineers of the U. S. Bureau of Public Roads and the California Division of Highways are making the resurveys jointly. The

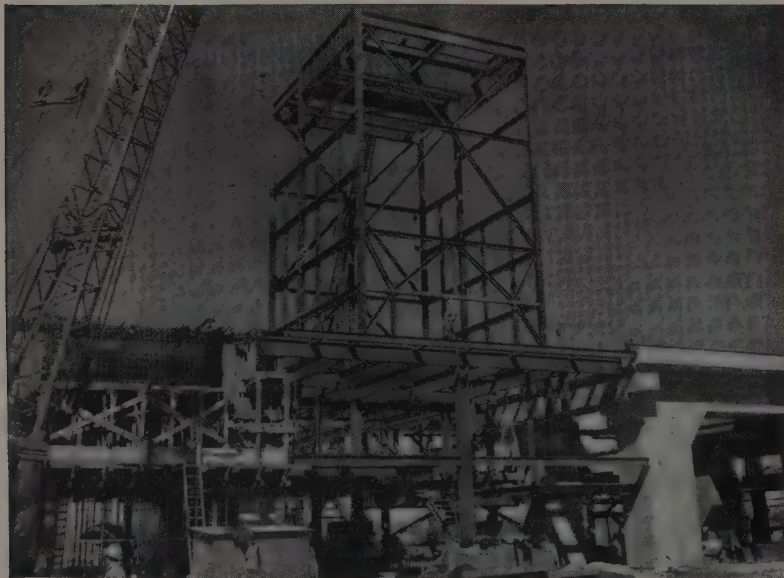
largest single project is restoring U. S. Highway 101 in Humboldt County near Orick for \$1,251,550. Next largest job will be the \$1,100,000 rebuilding of Route 180 in Fresno County.

B. P. BELLPORT, U. S. Bureau of Reclamation engineer in charge of the \$47,000,000 Monticello Dam said that although work on the project has been delayed since the December floods the project should be completed at the estimated date, the first of 1957. At this time work on the main barrier across Putah Creek is about 40% completed. Construction work is expected to begin again in mid-April.

THE ARMY ENGINEERS have released figures on the Yuba City levee break which was described in the March issue of **Western Construction**. The Engineers disclosed that the cost of the project was about \$3,000,000. Included in the equipment that worked on the emergency job were 83 crawler tractors, 8 wheel tractors, 10 draglines, 8 graders, and 2 dredges. In addition to men from Beale Air Force Base, some 400 contractors' employees and Army Engineer employees were on the job. An average of 175 trucks and a maximum of 222 trucks were used to haul cobble for rip-rapping the face of the new levee. Twelve additional draglines were used in this phase of the operation in which 370,000 tons of rock were moved. The project required the excavation of 2,250,000 cu. yd. of material which was compacted into 1,500,000 cu. yd. in place in the levee.

OVER ONE MILLION square feet of floor area will comprise a new facility to be built on a 55-ac. site adjacent to the existing Douglas Aircraft plant in Long Beach. Designs are due for completion by August 1, with construction scheduled to be completed by March 1957. Construction cost has been estimated at \$15,000,000. The two buildings to be built will contain more than 24 ac. of floor space. The foundation will be of reinforced concrete and the superstructure of steel framing. There will be an asphaltic concrete pavement of about 122,000 sq. yd.

TWO WEEKS after its construction, half of the temporary bridge across



A \$25,000,000 STEAM PLANT FOR ARIZONA

This 110-ft. steel lattice-work frame for a future boiler towers over the first unit of the Agua Fria steam power plant of the Salt River Power District (Phoenix) near Peoria, Arizona. Construction at the 80-ac. site will cost about \$25,000,000 and will employ between 200 and 300 men at the peak of the project. The plant will house its own administration offices.

Caterpillar announces a TURBOCHARGED

D397

(SERIES D)

650 HP

Maximum @ 1300 RPM

AND

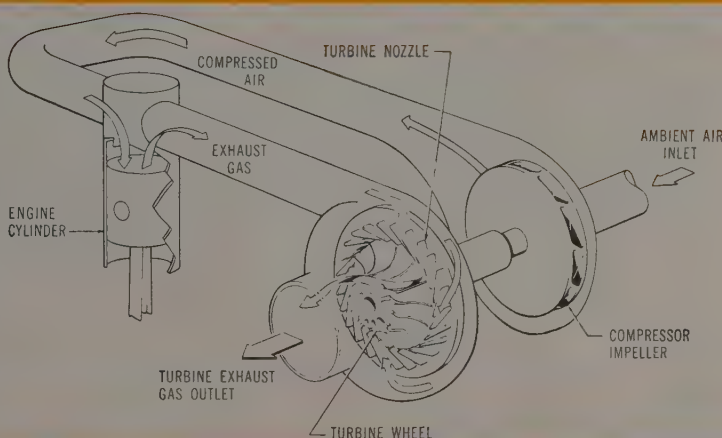
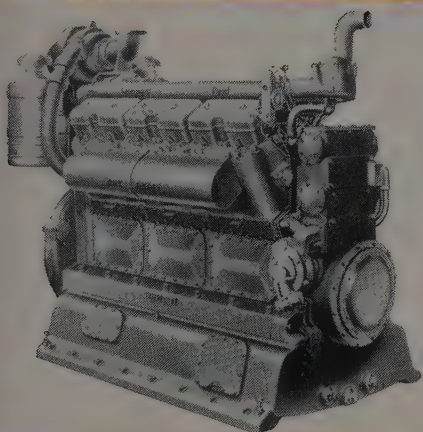
D375

(SERIES D)

430 HP

Maximum @ 1300 RPM

**Compact, modern heavy-duty diesels for
greater power, efficiency and economy!**



The Cat D397 Turbocharged Engine

Both the D397 and the D375 are also available as roots blown, naturally aspirated or spark ignited engines.

The Turbocharger... Exhaust Gas and Air Flow

Another example of Caterpillar leadership in action! The Turbo-

charger, driven by the engine exhaust, utilizes energy which would otherwise be lost. It packs air into the engine according to engine load for greater efficiency.

As shown in the diagram above, engine exhaust gases turn the turbine, which drives the compressor... the compressed air then enters the cylinders. Final result: more power on less fuel.

More than eighteen years of research have gone into these two new CAT* Turbocharged Diesels. Incorporating metallurgical, mechanical and aerodynamic advances, they are engineered to deliver higher horsepowers and lower operating costs at reduced noise levels. Their advance-design features are also available in D397 and D375 Electric Sets and Marine Engines.

With these engines in the Caterpillar line-up, you now have an even wider choice of

compact, modern heavy-duty power to meet your requirements. Get the complete facts about these two new Turbocharged Diesels from your Caterpillar Dealer!

Caterpillar Tractor Co., San Francisco, Cal.; Peoria, Ill., U. S. A.

CATERPILLAR*

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**MODERN
HEAVY-DUTY DIESELS**



CINCHING UP A 100-FT. SEWAGE TREATMENT TANK

Workmen for Soule Steel Co., San Francisco, are shown installing one of the 604 steel rods that circle three new sewage treatment tanks for San Jose, Calif. The rods, 29 ft. long and $\frac{7}{8}$ in. and 1 $\frac{1}{8}$ in. in diameter, were rolled by Bethlehem Pacific, then were roll threaded at each end.

Ends of the rods are joined by turnbuckles and tightened to a predetermined stress point. The tanks, with concrete walls 32 ft. high, have an inside diameter of 100 ft. and are banded by the steel rods to take up the pressure of 6,500,000 gal. of liquid. For description of concreting see *Western Construction*, Feb., p. 40.

E. V. Lane Co. and Walsh Construction Co., joint venture, is general contractor.

the Trinity River at Hoopa in Humboldt County was washed out. The Division of Highways entered into an emergency contract with Ben C. Gerwick to reconstruct it at a cost of about \$35,000. The temporary span was built by Gerwick to replace the steel bridge which was destroyed by the December floods.

THE LOS ANGELES County Regional Planning Commission has approved adoption of a law to permit erection of buildings 20 stories or more high in certain zoning districts within the county. The issue is now before the Board of Supervisors for final action. County area height limit for buildings is 13 stories or 150 ft. The new limit would be placed at 250 ft.

RECENT MAJOR CONTRACT AWARDS and low bids in California include a \$2,062,928 contract award to Guy F. Atkinson Co., South San Francisco for 2.4 mi. of grading and paving, construction of one steel, and three concrete bridges in San Diego County. A low bid of \$369,953 submitted by Thomas Construction Co., Fresno, for construction of two concrete, one steel bridge, grading, and surfacing roadbeds and ramps in Placer County. Ralph B. Slaughter, Julian, submitted a low bid of \$352,452 for about 2 mi. of grading and paving in the city of El Cajon, San Diego County. A \$930,580 contract was awarded to Baldwin Construction Co., Inc. and H. Earl Parker, Inc. of Marysville for 3.7 mi. of grading, surfacing, and one bridge to be remodeled in Yuba County. Earl

Brown, Beverly Hills, submitted a low bid of \$184,942 for construction of a concrete separation structure in Kern County. Arthur B. Siri, Inc., Santa Rosa, received a \$539,310 contract for 5 mi. of grading and surfacing in Mendocino and Lake counties. A \$228,344 contract was awarded to Stecker & Scott, Sun Valley, for 1.2 mi. of grading and surfacing in Monterey County. Griffith Company, Los Angeles, submitted a low bid of \$384,352 for construction of an underpass and widening the roadway in Kern County. Grove, Shepherd, Wilson & Kruege of Calif., Inc., Seattle, Wash., submitted a low bid of \$2,361,255 for the superstructure and a portion of the substructure for a portion of a bridge to be constructed in the city of Oakland, Alameda County.

COLORADO

THE CITY COUNCIL of Colorado Springs has approved construction of a \$6,000,000 freeway to be built through Colorado Springs. Members of the council approved unanimously state highway department plans to build the road. Purchase of right-of-way will begin this summer and construction may start within a year.

RECENT MAJOR CONTRACT AWARDS and low bids in Colorado include a \$528,513 award to L. H. Kilgroe, Denver, for 2.1 mi. of grading and surfacing in Arvada, Jefferson County. Lowdermilk Brothers Construction Co., Englewood, was

awarded a \$376,631 contract for 2.9 mi. of grading and surfacing State Highway 4, Fruitvale and Clifton, Mesa County. A \$132,356 contract was awarded to Mountain States Construction Co. of Denver for sewage trunk lines in Canon City. Baab Construction Co. and C. V. Hill of Greeley received a \$165,391 contract for grading, surfacing, and structures on 2.9 mi. of State Highway 66 in Weld County. Henry Shore Construction Co., Littleton, received a \$366,757 contract for grading and surfacing 5.2 mi. of State Highway 115 in Denver County. Graham Construction Co. of Pueblo received a \$388,628 contract for constructing 2.1 mi. of the Pueblo highway. A. A. & E. B. Jones Co., Denver, was awarded a \$1,576,000 contract for construction of the Baker Junior High School in Denver. Pioneer Construction Co., Pueblo, was awarded a \$671,495 contract for reconstruction of 16 mi. of U. S. Highway 36, east of Anton. Blanchard Construction Co. of Derby was awarded a \$113,759 contract for grading and paving 10.3 mi. of State Highway 82 in Pitkin County.

IDAHO

RECENT MAJOR CONTRACT AWARDS and low bids in Idaho include a low bid of \$127,042 submitted by Aslett Construction Co., Twin Falls, for construction of a bridge in Twin Falls County. J. H. Wise and Sons, Boise, was awarded a \$104,473 contract for grading, surfacing, and construction of two bridges in Canyon County. A low bid of \$92,664 was submitted by Union Electric Co., Denver, Colo., for electrical work for the Goshen Substation, Palisades Project. J. H. Wise & Sons, Co., Boise, submitted a low bid of \$104,473 for constructing concrete bridges over the New York and Mora Canals, State Highway 45 in Canyon County. Morrison-Knudsen Co., Inc., Boise, submitted a low bid of \$1,340,275 for schedule A, runway and taxiway extensions, airfield sidewalks, at Mountain Home.

MONTANA

WASHINGTON Water Power company has called for bids on a construction of the dam and powerhouse sections of the \$85,000,000 Noxon Rapids project on the Clark Fork River in western Montana. It is expected that a contract will be awarded before April 7. Noxon dam will be a combination concrete and earthfill structure with an overall length of 4,700 ft.



Pretensioned concrete piles driven to grade. Some (not shown) were 131.5' long and are believed to be the longest ever used.

**JOB
TAILORED**

PERMANENTE CEMENT

FOR MODERN CONSTRUCTION

Permanente "Job Tailored" PRONTO Cement was used in producing the pretensioned concrete piles for construction of piers 15 and 17 on the San Francisco waterfront... the first extensive use of these "modern methods" piles. Over 2,000 were driven as supports for the massive 8" steel and concrete deck slab.

The piles were produced by Ben C. Gerwick, Inc., at their Petaluma yard. The eight-sack Permanente PRONTO mix developed concrete strengths of 4,000 to 5,000 psi within 24 hours.

**ON THE JOB
ON TIME**

**PERMANENTE
CEMENT COMPANY**



PERMANENTE, SANTA CLARA, YOSEMITE AND KAISER BRANDS
OF PORTLAND CEMENT AND PERMANENTE LIME PRODUCTS

OAKLAND • PORTLAND • SEATTLE
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RECENT MAJOR CONTRACT AWARDS and low bids in Montana include a low bid of \$103,092 submitted by Van Dever & Co., Billings, for Fort Peck-Whately transmission line, Fort Peck Project. Sound Construction & Engineering Co., Seattle, Wash., is low bidder at \$3,027,840 on a contract for construction of 26 buildings, two igloos and utilities at Glasgow air force base, eastern Montana.

NEVADA

PLANS have been drawn for a 50-ac., \$8,000,000 shopping center in Las Vegas. Start of construction is scheduled for late 1956 with completion in 8 to 10 months. Plans were drawn by Pereira & Luckman, Los Angeles, architects.

RECENT MAJOR CONTRACT AWARDS and low bids in Nevada include a \$1,152,474 contract awarded to C. H. Leavell-Utah Construction Co. of Salt Lake City, Utah, for additional construction of two barracks, welfare building and bore sight range for jet aircraft at the Fallon Naval Auxiliary Air Station. The same firm now has a \$3,651,000 building contract at the base plus a \$673,000 housing construction contract there. Isbell Construction Co., Reno, was awarded a \$552,932 contract for 3.9 mi. of grading and surfacing 4 miles south of Reno in Washoe County.



KAISER ALUMINUM EXPANDS TACOMA PLANT

Ironworkers are pictured fabricating one of the skeletons for a group of heavy reinforced concrete columns, part of Kaiser Aluminum & Chemical Corp.'s \$2,250,000 expansion program at the Tacoma, Washington, works. The plant expansion will house 18 new aluminum reduction cells capable of producing 10,000,000 pounds of aluminum per year to bring the plant's total annual capacity to over 77,000,000 lb. Largest reinforcing bars shown here are Bethlehem Pacific's No. 14 size and measure more than 1 1/4 in. in diameter.

NEW MEXICO

ALBUQUERQUE construction got off to a fast start in 1956 with building permits totaling over \$4,000,000 issued in January. Last year slightly over \$3,000,000 was recorded for January, which leads city officials to expect that 1956 will be a record building year.

RECENT MAJOR CONTRACT AWARDS and low bids in New Mexico include a low bid of \$147,760 submitted by James P. Johnson, Santa Fe, for earthwork on the Middle Rio Grade Project. G. I. Martin, Albuquerque, was awarded a \$111,841 contract for 9.5 mi. of grading and surfacing in Eddy-Lea counties. A \$169,562 contract was awarded to Armstrong & Armstrong of Roswell, for grading and surfacing 5.7 mi. of highway in Chaves County. Floyd Haake of Santa Fe was awarded a \$117,143 contract for 5.2 mi. of grading and surfacing in Sierra County. Lowdermilk Brothers, Espanola, was awarded an \$897,648 contract for 5 mi. of grading and surfacing in Rio Arriba County. A \$398,394 contract was awarded to Brown Contracting Co., Albuquerque, for 6.1 mi. of grading and surfacing in San Juan County. Floyd Haake, Santa Fe, received a \$177,693 contract for 1.6 mi. of grading and surfacing the Roswell-West road in Chaves County. A \$286,000 award was received by G. I. Martin, Albuquerque, for grading and surfacing the James Canyon Route, Lincoln National Forest in Otero County.

OREGON

PORTLAND General Electric Company has authorized a \$173,000 contract award to Fred H. Slate and E. C. Hall Company for the construction of 4 mi. of access roads to the site of the Pelton Dam on the Deschutes River. The project is located in an 800-ft. deep canyon west of Madras in central Oregon. Specifications for the major dam structures have been issued and include a fish ladder almost 3 mi. long.

THE PORTLAND DISTRICT, Corps of Engineers, has available a 29-min. sound color motion picture showing the progressive construction of Detroit Dam on the North Santiam River in Oregon. The film is obtainable on loan from the Division Engineer, North Pacific Division, 210 Custom House, Portland 9, Oregon.

CALIFORNIA Oregon Power Company has announced that government sanction for the \$70,000,000 Klamath River Project is expected in time to start construction by June 1. Several hundred construction workers will be employed and the job will create a multi-million dollar payroll. Final steps to permit construction will come after the contract is filed with the Hydro-Electric Commissions of Oregon and California and the Federal Power Commission in Washington, D. C. It is expected that the project will be in full swing by 1957.

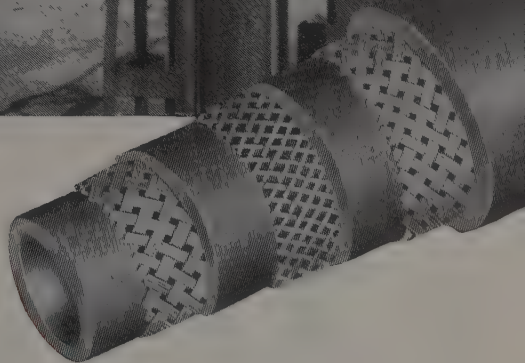
GUY F. ATKINSON COMPANY, San Francisco, has submitted the low bid of \$6,681,940 for construction of the new Interstate bridge and widening of the Oregon Slough bridge on the Oregon approach to the Columbia River crossing. The Peter Kiewit Sons' Company was just \$100,000 away from the low bid. The Highway Department had estimated the cost to be \$8,250,000.

RECENT MAJOR CONTRACT AWARDS and low bids in Oregon include a low bid of \$130,170 submitted by Pettijohn Engineering Co. of Portland for bridge and roadbed construction in Columbia County. R. H. Jones, Hillsboro, submitted a low bid of \$101,735 for bridge construction in Klamath County. Gibbons & Reed Co., Portland, submitted a low bid of \$616,641 for grading and surfacing in Lane County. A low bid of \$277,333 was submitted by Roy L. Houck & Sons, Salem, for grading and paving in Umatilla



DOWN TIME... ZERO

Nothing gives hose a worse beating than a pile driver. And here's hose built to take it . . . day in and day out! Thermoid Powerflex Pile Driving Hose has the brute strength that assures longer wear, fewer replacements. *You can forget about down time.* Yet Powerflex is lightweight, flexible, kink-resistant, easy to handle.



No wonder it's tough . . . look how it's made

- Heat and oil resistant tube.
- High tensile braided steel wire reinforcement prevents bursting . . . gives flexibility.
- Special pattern of the wire braid develops positive lock of tube and cover to reinforcing structure. Mechanically bonded insulating plies assure
- homogeneous body structure.
- Internal stress of the hose under pressure is completely absorbed by the wire braids, not the insulating plies.
- Tough, specially compounded cover resists abrasion and aging.

Thermoid Powerflex Pile Driving Hose is only one of many types of Thermoid hose built to give the construction industry longer service and lower operating costs. The Thermoid Distributor in your

area carries a complete line of Thermoid Hose, Multi-V Belts and Conveyor Belting, to meet the most exacting needs of every job.

Cut costs with Thermoid
Conveyor Belting . . .



. . . and Thermoid Multi-V Belts.



Offices and Factories:
Trenton, N. J. Nephi, Utah

County. Allum Bros., Eugene, submitted a low bid of \$349,502 for grading and oiling the McKenzie highway in Deschutes County. Warren Northwest, Inc., Portland, submitted a low bid of \$364,241 for grading and paving in Klamath County. A low bid of \$899,964 was submitted by Tom Lillebo, Reedsport, for grading, paving, and a structure in Klamath County. George E. Berry, Beaverton, submitted a low bid of \$101,500 for grading, oiling, and structures in Umatilla County. A low bid of \$108,080 was submitted by Birke-meier Construction Co., Milwaukie, for construction of a bridge in Yamhill County. Coos Bay Dredging Co., Inc., Coos Bay, submitted a low bid of \$476,137 for construction of breakwater and boat basin in South Slough, Coos Bay, at Charleston. Miller & Strong, Inc., Eugene, submitted a low bid of \$174,765 for construction of slope protection facilities on the Union Pacific Railroad embankment near Rufus, Ore., east of the John Day River.

UTAH

RECENT MAJOR CONTRACT AWARDS and low bids in Utah include a \$132,693 award to L. J. B. Construction Co. and H. J. Wimmer, of Price, for 2.9 mi. of grading and surfacing in Emery County. Morrison-Knudsen Co., Inc., Salt Lake City, was awarded a \$219,549 contract for 2.5 mi. of grading, surfacing, and construction of a concrete bridge in Garfield County. Gibbons & Reed Co., Salt Lake City, received a \$2,152,663 contract for schedule B apron parking at the Hill Air Force Base. Carl E. Nelson Construction Co. of Logan, submitted a low bid of \$264,172 for grading and paving 2.8 mi. of streets in Blackfoot.

WASHINGTON

FINAL PLANS and specifications for the \$160,000,000 Priest Rapids Dam have been sent out to 38 contractors by the Grant County Public Utility District. The project will be built on the Columbia River 14 mi. downstream from Beverly. Construction is expected to start by July 1, 1956.

A TOTAL of \$328,071 has been budgeted for new construction out of a total road building budget of \$620,671 in Jefferson County. It is likely, however, that the contemplated construction program may not be entirely completed because funds

may be taken to restore flood damaged sections of road.

THE WASHINGTON State Supreme Court will hear arguments May 14 on the legality of a proposed \$227,000,000 Tacoma-Seattle-Everett toll highway. The court will review the recent decision by the Thurston County Superior Court which upheld legality of the project.

RECENT MAJOR CONTRACT AWARDS and low bids in Washington include a \$272,317 award to John E. Alexander of Seattle for construction of a bridge in Thurston County. Charles A. Power, Spokane, was awarded a \$156,331 contract for bridge construction in Spokane County. Goodfellow Bros., Inc., Wenatchee, was awarded a \$95,024 contract for 4.9 mi. of grading and surfacing in Adams and Grant counties. H. C. Werner and Tauf Charneski, Eugene, submitted a low bid of \$546,919 for earthwork, lining, and structures, West Canal Laterals, Columbia Basin Project. A \$395,058 contract was awarded to Wilder Construction Co., Inc., Bellingham, for 2.5 mi. of grading and surfacing in Skagit County. D. A. Sullivan, Spokane, was awarded a \$78,153 contract for 7.6 mi. of grading and surfacing in Franklin County. Associated Sand & Gravel Co., Everett, was awarded an \$82,340 contract for 2.2 mi. of grading and surfacing in Snohomish County. Cherf Bros., Inc., and Sandkay Contractors, Inc., Ephrata, submitted a low bid of \$416,897 for earthwork and structures on Block 18 east low canal laterals, Columbia Basin Project. Northwest Construction Co., Seattle, submitted a low bid of \$119,394 for 1.3 mi. of grading and surfacing in King County. Henrik Anderson was awarded a \$1,600,000 contract for addition to the Wesley Gardens Retirement Home in Des Moines. Grant Construction Co. of Coeur d'Alene, Ida., was awarded a \$138,239 contract for 10.2 mi. of grading and surfacing in Franklin County.

WYOMING

IN A FEBRUARY meeting the Highway Commission rejected all bids on the grading, draining, and surfacing of 7.5 mi. of the Medicine Bow-North Road in Carbon County. Knisely-Moore Construction Company had submitted the apparent low bid of \$499,389 but the commission said that even that amount was too high.

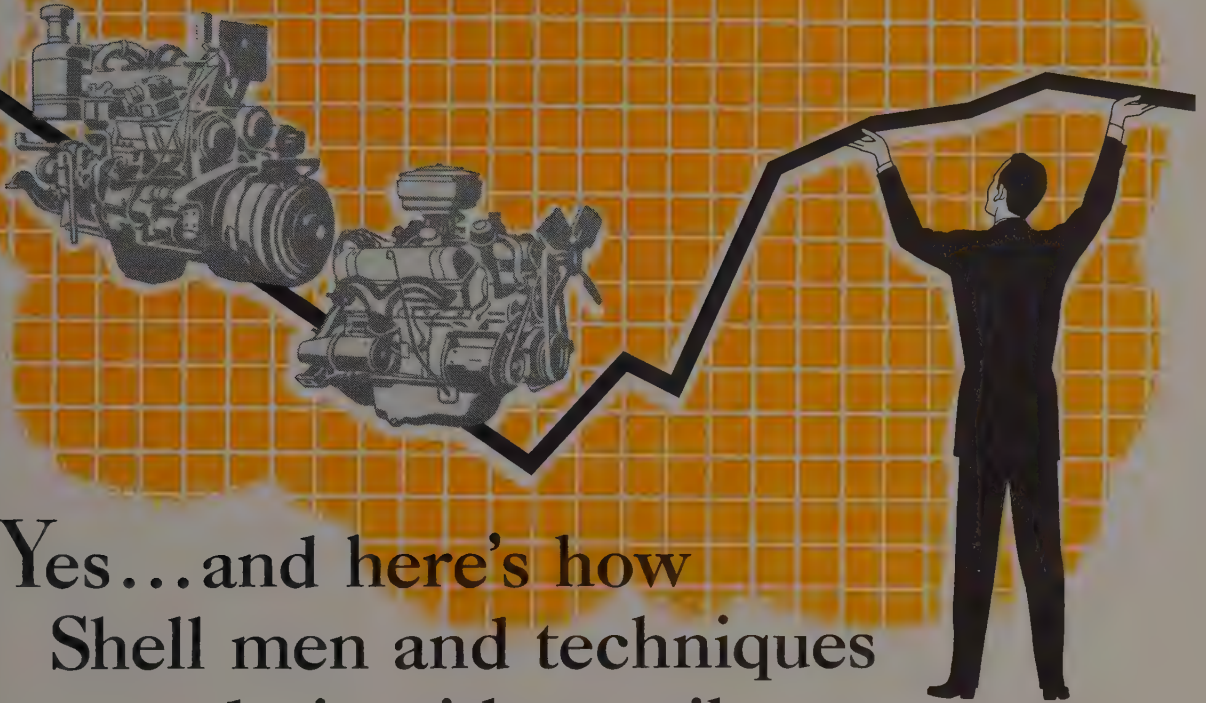
RECENT MAJOR CONTRACT AWARDS and low bids in Wyoming include a low bid of \$62,000 submitted

by Jusman Brothers of Sheridan for installing one culvert, a bridge over Coal Creek and a bridge over Carpenter Creek on 5.5 mi. of the Sussex-Linch road in Johnson County. Summit Construction Co. of Rapid City, S. Dak., was awarded a \$196,802 contract for grading, draining, and surfacing 5.1 mi. of the Gillette-Moorcroft road in Crook County. S. Birth & Sons Construction Co. and S. Birch, Inc., Great Falls, Mont., received a \$520,853 contract for 9.4 mi. of grading and surfacing on the Manderson road in Big Horn County. A \$269,967 contract was awarded to C. L. Hubner Co. of Denver, Colo., for grading, surfacing, and miscellaneous work on 12.5 mi. of the Laramie-Ft. Collins road in Albany County. Taggart Construction Co. of Cody won a \$339,304 contract for 4.9 mi. of grading, draining and surfacing in Washakie and Hot Springs counties. Knisely-Moore Co., Douglas, received a \$73,490 contract award for grading and surfacing on 10.3 mi. of the Douglas-Cold Springs road in Converse County. Reed Construction Co., Cheyenne, received a \$69,730 award for grading, surfacing, and miscellaneous work on 9.3 mi. of the Chugwater-East road in Platte County. A \$289,685 award was won by Richardson Const. Co., Inc., of Miles City, Mont., for grading, surfacing, and miscellaneous work on 23.8 mi. of the Gillette-Broadus road in Campbell County.

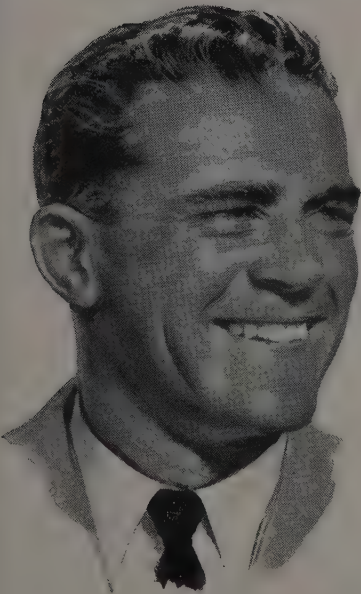
ALASKA

RECENT MAJOR CONTRACT AWARDS and low bids in Alaska include a low bid of \$584,000 submitted by Chris Berg, Inc., of Seattle Wash., on schedule A and B for construction of test lab and dental clinic at Eielson Air Force Base. American Service Co., Inc., Anchorage, submitted a low bid of \$242,004 total for the two schedules of a contract for construction of Tacan and AC&W facilities on Middleton Island in the Gulf of Alaska. A low bid of \$9,045,575 was submitted by M-B Contracting Co. of Seattle, Wash., for runway and taxiway extensions at Elmendorf Air Force Base. Northern Corp. of Anchorage, submitted a low bid of \$202,822 for construction on Fire Island, which is located at the juncture of Knik and Turnagain Arm near Anchorage. Reed & Martin, Fairbanks, submitted a low bid of \$196,000 for construction on Murphy Dome, which is near Fairbanks. E. M. Peterson, Spenard, submitted a low bid of \$123,870 for construction on Campion, located at Galena on the Yukon River.

Can the working life of gasoline and diesel engines be extended?



Yes...and here's how Shell men and techniques do it with an oil



The *cause* of engine wear—that's where Shell Research men began. Finding that *harmful acids* are the major cause, they set out to develop an oil which could *stop* acid action.

Result? After years of testing countless new formulas, the Shell Research team developed SHELL ROTELLA OIL—a tough, heavy-duty oil that adds years to gasoline and diesel engine life... an oil that can save hundreds of dollars in replacement costs.

Shell Rotella not only stops acid action, but keeps engines *clean* as well. A truly balanced oil, it also has detergent-dispersant and oxidation inhibiting properties.

Rotella is just one of the fine products developed by Shell's 1500-man research team—a team with 25 years' experience in gasoline and lubrication problems.

A telephone call can put this team to work solving your lubrication problems. Call in your Shell representative today.



SHELL ROTELLA OIL

ALASKA Newsletter

By CLIFFORD S. CERNICK, Anchorage

TOUR OF NORTH—I have just returned to Anchorage from a 3,000-mi. tour of the Northland—a tour that took me through most of Alaska and northern Canada. For one ordinarily tied to the comforts and conveniences of metropolitan Anchorage, the tour was an eye-opener. And because each of you—whatever your status in the construction field—may have to travel under Alaska's and Canada's conditions, I'm going to devote a sizable chunk of this month's newsletter to telling you about my trip.

THE TRIP—My odyssey to the North began up the Hart highway in southern Canada; through the Canadian Rockies, up the Alaska highway through Yukon Territory, then into the heart of Alaska. This automobile trip is one that hundreds of construction workers have taken during their annual trek north to the Alaskan "promised land." My trip was different; it was in winter and I wasn't merely wanting to get somewhere—I was trying to observe as much as possible.

THE ROAD—A venture into the unknown can sometimes be a frightening experience. A drive from the warmer climes of the Pacific Coast into the frigid Yukon Territory where the legendary white death of winter seems to linger according to the Robert Service legends—that can be quite an undertaking. As you begin your journey you hear all the harrowing tales that reflect what has happened and been imagined by those who traveled the road before you. I, for example, heard of the young couple who froze to death on the Alaska Highway when their car bogged down in a snowbank; of the treacherous mountain roads that had to be crossed; the blizzards and a thousand hazards.

THE REALITY—Thinking that perhaps I was making a mistake by leaving the states without having made out my will, I pointed the nose of my 1950 car northward. I was determined to see for myself. I came and I saw. The drive from the states to Alaska in winter is no more—and perhaps less—menacing than the drive from the State of Maine to the State of Washington. Throughout Canada and Alaska roads were good. Expert highway maintenance kept the road to the golden North in tip-top shape. Only in a few stretches—none more than 20 or 30 mi.—was the highway narrow or in any sense hazardous. Most

of the travelers I saw, like me, were able to keep up a 50-mile-an-hour pace over the hard-packed carpet of ice and snow. Winter snow tires on my car gave plenty of traction. When I became accustomed to the road—I treated the surface very much like paving.

THE PEOPLE—If you travel north, as I did, in the winter you will find friendliness everywhere along the road. If, unfortunately, you should have car trouble or should end up in a snowbank—it won't be long before someone will be along to offer you assistance. The roadhouses are 30 to 40 mi. apart generally and you're a pretty slow driver if you don't pass one an hour. These spots offer gas, lodging, and meals as well as a certain sense of security that goes with knowing that you're not at the mercy of the wilderness.

THE SCENERY—The trip north, even in winter, offers magnificent scenery—an ever-changing panorama of vistas encompassing the continent's last-remaining areas of virgin wilderness. Mountains, plains, rural settings unwind before you, with each day offering a fresh perspective on the amazing Northland. If you're a camera fiend—this trip is for you.

AT LAST, CONSTRUCTION—To return at long last to the subject of construction which is what I'm supposed to confine myself to, my trip north leads me to believe that Alaska and the Yukon are on the threshold of a continuing construction boom. All along the highway are signs of progress and activity. Homes and buildings going up, new roads being built, new towns mushrooming in the wilderness. In both Alaska and Canada the atmosphere was one of optimism and confidence. I saw big trucks speeding by loaded with huge segments of pipe for a big gas line that will traverse Canada. I heard talk of a new railroad that would tap the wealth of northern Canada and maybe push as far as Alaska. I talked to men who envisioned a fabulous future for the vast frontiers through which I passed.

SOME TIPS—In the event you decide to hop into your car and come speeding north, let me provide a few tips to paste in your hat band. Take along a good tow rope, a shovel, a hatchet, and a set of tire chains. You probably won't need any of this stuff but it's nice to have with you in case you do. The drive from the Canada-

U. S. border will take you at least seven days before arrival at Anchorage or Fairbanks. It took me ten, but I wasn't in a hurry and wasn't trying to break any speed records. Canadian customs won't give you a bad time, unless you happen to look like you're running away from something, and won't go poking around in your baggage. Drive on the upper half of your gas tank. Keeping it filled will come in handy should you become stuck and also prevents condensation from mixing with your gas supply.

TRAVEL ODDS AND ENDS—A few notes in helter-skelter fashion brought back from my tour of Alaska and Canada . . . One Canadian referred to the stream of Americans driving across the Alaska Highway as "Dangerous Devils" because of the risks Americans take and the speed at which they travel . . . Fifty below zero at Watson Lake . . . Driving a car through a heavy snowstorm can make you wish you had a dog team instead of a high powered engine out in front of you . . . The old construction camps along the Alaska Highway are gradually being turned into tourist courts and highway lodges.

CONSTRUCTION NEWS NUGGETS—The Haines-Fairbanks pipeline is requiring extra maintenance during the freezing winter weather . . . Laborers in Ketchikan have received a new base scale of \$3.22 an hour with some classifications running as high as \$3.77 . . . The Nome Chamber of Commerce has appealed to Morrison-Knudsen for establishment of a general local hiring office in Nome. Approximately 200 skilled and semi-skilled Nome workers are reported available for the Arctic jobs being supervised by M-K . . . Winter employment in Fairbanks is at an all time high, with a total of 10,882 persons employed as compared with 9,552 a year ago . . . Alaska Railroad employes in Anchorage have received wage increases totaling between \$500,000 and \$600,000 annually . . . An 18-mi. stretch of the Sterling highway bisecting the national forest on the Kenai peninsula will be paved this year, the Bureau of Public Roads announces . . . The city of Fairbanks is preparing for the biggest utilities construction program in its history . . . Anchorage paid a fortune for snow removal this year—more than \$100,000 . . . Delegate E. L. Bartlett is urging congressmen to support a \$175,000,000, 10-yr. road building program for Alaska . . . The government-owned McKinley Park hotel will be open for business as usual next summer; this is a favorite playground for Alaskans who want to "get away from it all."

NEW LOW CLEARANCE HEIGHT and COMPLETE HYDRAULIC CONTROLS make the MULTIFOOTE even better

New Design Cuts Cycle Time by giving you
Faster Skip Operation

PLUS—faster travel preparation •
faster bucket spotting • faster discharge

MultiFoote Pavers with these new hydraulic controls and faster skip operation give you an even faster cycle time than before, *plus a new low overall clearance height.* You get all the advantages of single-cable skip control with its high speed, simple reeving and low maintenance cost. Now in a matter of a few seconds, the operator can raise the skip carrier bracket and lower the A-frame with fast-acting hydraulic cylinders to get under overpasses, bridges or other low overhead clearances.

Hydraulic controls also step up the high capacity of the MultiFoote by faster batch transfer, faster discharge chute operation and faster bucket spotting. These hydraulic controls plus the faster skip operation now mean that you can put out more concrete with a Blaw-Knox Paver than any other paver.

All the features that have made MultiFoote Pavers the leaders in their field have been retained or improved. The

efficient, double-cone drum folds material over and over for thorough mixing, has no corners for material to build up in and cleans itself with a scouring action. High operator's platform gives the operator an unobstructed view of skip and bucket at all times—there are no "dead spots." Efficiently grouped controls for manual and automatic cycle operation cut seconds out of the mixing time for each batch. Shovel-type crawlers with their self-cleaning action give positive traction, ample flotation on soft grades and are designed to stand up to miles of highway paving travel. Volume measurement, non-pressure water system that is unaffected by grade, the wide, smooth rigidly mounted skip and simplicity of design assure shift-after-shift high capacity and easy upkeep.

If you are bidding on turnpike work or any big paving job, see your Blaw-Knox Distributor and get all the details on the New MultiFoote with hydraulic controls.



BLAW-KNOX COMPANY

Construction Equipment Division, Mattoon, Illinois

45 Charleston Avenue

Blaw-Knox Pacific Coast Branch: 818 Monadnock Bldg., 681 Market St., San Francisco 5, Calif.

ENGINEERS on the move

Harold Boehmer, a veteran of Utah Power & Light with 21 years service, was recently named chief engineer of this public utilities service with headquarters in Salt Lake City. He takes the place of T. A. Purton who served as chief engineer since 1943. Retiring from UP&L, Purton has joined Ebasco Services, Inc., as a member of a technical advisory group in Greece. Boehmer joined Utah Power in 1934 and progressed through varied engineering positions to that of office engineer, which post he held until appointed chief engineer.

* * *

Four veteran engineers of Utah Power & Light were recently upgraded in new appointments. Paul A. Blanchard has been assigned the new post of assistant superintendent of power, steam, and will continue in charge of the operation of all system steam-electric plants. John S. Anderson succeeds to Blanchard's prior position as steam production engineer. William C. Stacy was promoted to succeed Anderson as a mechanical engineer. James S. Hooper was named communications supervisor. He joined UP&L in 1946 as an electrical engineer.

* * *

Frank Young, after 36 years con-

tinuous service with the Oregon Highway Department, recently retired as assistant division engineer, Division 1, in charge of construction, with headquarters at Oregon City.

* * *

William A. Bugge, director of highways for the state of Washington, has been elected to offices in two national highway officials organizations, as a vice president for the Western region of American Road Builders' Association, and as a member of the executive committee of the American Association of State Highway Officials.

* * *

William J. "Bud" Quinn, Bureau of Reclamation engineer, who until recently was construction engineer on the Kirwin Dam project in Kansas, is now on the Driftwood-Meeker canal project as construction engineer, with headquarters in McCook, Neb.

* * *

James G. Patrick, chief of the geology, soils, and materials branch of the North Pacific Division, Corps of Engineers, Portland, recently resigned to accept a position as project engineer with Bechtel Corporation, and will make his headquarters in Los Angeles. He was first employed



JUSTIN HERMAN of Phoenix, who became secretary of the Arizona State Highway Commission on resignation of **James Herron**. The new executive secretary, veteran highway department superintendent of equipment, has been employed by the department since 1943.

by the Portland District in 1939; left for Army duty in 1941, and following the war was re-employed by the Corps and assigned to the North Pacific Division where he has worked continuously ever since. He is being replaced by **Harold W. Stuart**.

* * *

Herman H. Rappaport announces the formation of the Rappaport Construction Co., with temporary headquarters in Torrance, Calif., following his resignation as engineering construction manager of factory construction for McDonald Brothers. The new firm has been organized to serve heavy industry in construction involving reinforced concrete and mechanical engineering projects.

* * *

Joseph A. Fraps is now located at Torrance, Calif., as deputy project manager for Kiewit-Early, joint venture on construction of an industrial plant for Carbide & Chemicals Co. Until this recent move he was with North Atlantic Constructors as assistant project manager on construction of air bases at Thule and other locations in Greenland.

* * *

James M. Sturgeon, employed by the California Division of Highways, was recently promoted to senior highway engineer, located at District V, San Luis Obispo. He previously occupied the post of associate highway engineer—resident engineer.

* * *

Dudley B. Hatch, recently attached to the construction department of the Division of Highways, District X, Stockton, Calif., has moved to San Diego where he is employed in the design department.



ONE JOB DONE, ONE BEGUN—Presidency of the Anchorage Chapter of the Society of American Military Engineers changes at annual installation dinner at Fort Richardson. Left, **Col. Carl Y. Farrell**, Alaska District Engineer, retiring president, smiles and relaxes as he turns over the responsibilities to **Ken Sheppard**, general manager of Alaska Concrete Products Co., incoming president.

new, improved
PAYLOADER[®]
 tractor-shovel

model HO
 2½ cu. yd. CAPACITY
 7,500 lbs. @ 4 mph



Bigger Capacity—Better Performance

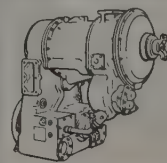
This new 1956 model HO has a bucket capacity of 2¼ cu. yd. payload, 1¾ cu. yd. struck . . . is the biggest capacity "PAYLOADER" ever offered, and outstanding by any measure. Pound for pound, it's way ahead of the field in digging power and carrying capacity. The famed Hough bucket motion has powerful pryout action and 40° tip-back at ground level to *get* big loads and *hold* big loads without spilling.

It has power brakes, power steer and power shift . . . is more maneuverable . . . faster and easier operating and easier riding — with or without a load. It delivers better, more reliable traction over a wider range of ground conditions than any wheeled tractor-shovel *ever* has. It has balanced design and durability *throughout* to deliver big yardage day after day without interruption.

If you want the last word in a big husky tractor-shovel, insist on a model HO. Your "PAYLOADER" Distributor has all the facts.

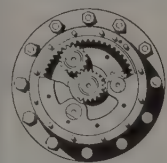
Complete Power-Shift Transmission

The fastest and easiest-operating transmission ever built. All shifts can be made instantly, on-the-go, under full engine speed. There's no stopping for a RANGE shift, there's no foot clutch. With the forward-reverse control the operator can "creep" the machine at full engine speed, in any gear, while maintaining full bucket action . . . all this plus torque converter drive.



Planetary Final Drives

Rugged planetary final drives in the wheel hubs, plus hypoid differential gearing, keep torque low in axles . . . prolong life of axles and all drive train parts. Torque-proportioning differentials assure effective traction under slipping conditions. If one wheel starts to slip more power is delivered to the opposite wheel.



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707 Sunnyside Ave., Libertyville, Ill.

Send full information on "PAYLOADER" 4-wheel-drive tractor-shovels.

☐ model HO—2¼ cu. yd. ☐ model HH—1½ cu. yd.
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Francis N. Hveem is the new president elected to head for one year the Sacramento (Calif.) Section of the American Society of Civil Engineers. Francis G. Christian is first vice president, and Irvin M. Ingerson, second vice president. Robert F. Fingado is secretary, and J. Carl Jennings, junior past president. The board of directors appointed Maurice E. Cornelius to act as treasurer for 1956.

* * *

Frank J. Rooney of Miami, Fla., was installed as 1956 president of The Associated General Contractors of America at its 37th annual convention. Lester C. Rogers, Chicago, was installed as vice president. Among the new national directors installed are the following from the West: G. B. Seebeck, The Green Co., Spokane, Wash.; J. A. Woodworth, Woodworth & Co., Inc., Tacoma, Wash.; Frank F. Burrows, Williams & Burrows, Inc., Belmont, Calif.; William E. Irish, E. A. Irish, Los Angeles; Keppel Brierly, J. & K. Construction Co., Denver, Colo.; I. G. Homes, Homes & Son Construction Co., Phoenix, Ariz.

* * *

Walter L. Dickey is newly elected president of the Structural Engineers Association of Northern California. He succeeds H. A. A. Schirmer. Dickey is chief civil and struc-



Walter L.
Dickey

tural engineer for the Power Division of Bechtel Corporation. New vice president of the Association is Henry J. Degenkolb. Two new directors, Charles D. De Maria and James L. Stratta, were chosen to serve with William W. Brewer and Clarence E. Rinne, hold-over directors.

* * *

Wallace A. Norum, Lodi, Calif., recently joined the staff of the American Wood Preservers Institute as a district engineer covering the territory of California, Nevada, Utah, Arizona, and New Mexico. He comes to AWPI after several years with the City of Lodi as a building official.

* * *

Kenneth Brunner has established offices at 2918 Gilroy St., Los Angeles, for the practice of civil engineering. Brunner was formerly chief design engineer for Francis H. Bulot, Consulting Engineers, Inc., of Pasadena, and prior to that was in charge of design and construction for the civil engineering work on the

Disneyland project in Southern California.

* * *

Maj. Gen. Lee B. Washbourne, Assistant Chief of Staff, Installations, U. S. Air Force, recently made a tour of the West, inspecting progress of construction and maintenance activities. During the West Coast portion of his trip he was joined by Col. Edwin M. Eads, AF Installations Representative, South Pacific Region at San Francisco. While in San Francisco, General Washbourne addressed a meeting of several hundred military and civilian engineers from air bases throughout California.

* * *

Col. Robert N. Swartz, C. E., in early March took over his new assignment as Engineer, Pacific Transportation Terminals Command. This new command presently has its headquarters at Fort Mason, Calif. Colonel Swartz has been with the Los Angeles District, Corps of Engineers since 1953, most recently as assistant district engineer there.

* * *

Carl O. Swanson, employee of Utah Construction Co., has been transferred from the Copper Development project at San Manuel, Ariz., to Weldon Spring, Mo., as senior engineer on this AEC project.

* * *

Malcolm R. Gilpin has succeeded Roy G. McGlone as chief of the operations division of Southwestern Division, Corps of Engineers, Dallas, Texas. For the past eight years Gilpin held the corresponding post in the Alaska District.

* * *

John D. Shaw, supervising highway construction engineer with Division 7 of the Bureau of Public Roads, San Francisco, recently retired upon completion of 37 years' service. He was in a large measure responsible for the development of federal-state-county cooperation in the planning and construction of highways in Arizona, California, and Nevada.

* * *

John J. Gould announces the association of Henry J. Degenkolb and the formation of a partnership for the practice of civil and structural engineering under the firm name of John J. Gould and H. J. Degenkolb, Consulting Engineers. R. Gordon Dean will be chief engineer and Thomas D. Wosser will be office engineer in the new organization, which has headquarters at 149 California St., San Francisco 11, Calif.

* * *

The 1956 Board of Directors of the Structural Engineers Association of California recently held their first organizational and business meeting to lay active plans for the new year. The association, through its three sections, Northern, Central, and Southern, represents about 900 practicing engineers in the state. President C. M. Herd presided at the

meeting, assisted by Secretary-treasurer J. F. Meehan. Vice president W. T. Wright is on an extended trip to Australia and therefore absent.

* * *

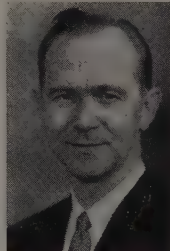
Plans for the Corps of Engineers' Eagle Gorge Dam were recently reviewed in the office of Col. N. A. Matthias, District Engineer, Seattle, by a board of consultants consisting of I. C. Steele of San Francisco, Dr. A. Casagrande and James P. Growdon. These men were joined for the 2-day conference by ten engineers from the Seattle District, the North Pacific Division and the office of the Chief of Engineers, Washington, D. C.

Eagle Gorge will be a rock-fill dam with a central impervious core of compact material. Main construction will start in the spring of 1958 and extend over two working seasons until completion of schedule in the autumn of 1959. Work is being started on relocation of 14 mi. of the Northern Pacific Ry. in the dam and reservoir area. This phase will be completed in two years.

James F. Grafton has been designated as project engineer for this new flood control project located on Green River in King County, west-



Grafton



Coffman

ern Washington. Grafton has been transferred from Albeni Falls Dam in northern Idaho where he was resident for the last five years. Kenneth T. Coffman from Seattle District headquarters is named as acting project engineer at Albeni Falls.

CALENDAR

April 10-13—Western Association of State Highway Officials, annual conference, Westward Ho Hotel, Phoenix, Ariz.

April 15-17—Western Public Works Conference, Hotel Leamington, Oakland, Calif.

April 25-27—Western Concrete Pipe Association, annual meeting, Hacienda Motel, Fresno, Calif.

May 6-10—American Water Works Association, 75th anniversary meeting, Kiel Auditorium, St. Louis, Mo.

May 16-18—Prestressed Concrete Institute, annual convention, Hollywood Beach Hotel, Hollywood, Fla.



ROSSI

CUTS

MAINTENANCE

COSTS

WITH CAT-BUILT EQUIPMENT

S. V. Rossi Construction Co., of Torrington, Conn., has found it pays to keep accurate records of machine costs. Here's a report by Mr. Adolph Rossi:

"When we buy a machine we figure the maintenance cost over a season. We've found there's no comparison—Caterpillar-built equipment has it over all other makes. We started in 1930 with machines built by two other manufacturers. Later we started trading them for Cat-built equipment because we had seen the light. Now we have all Caterpillar Diesel Tractors."

One of the machines in the Rossi fleet is the CAT* D7 Tractor with No. 7S Bulldozer, shown here grading a slope on a road construction job between Bethel and Woodstock, Vermont.

The D7 is a long-time favorite with contractors—a rugged, dependable producer. Today the *new* D7 (Series C) gives you the added advantage of a 128 HP engine and 28,700 pounds maximum drawbar pull. It has the long-wearing Caterpillar oil clutch; a gear

driven balancer that gives smoother performance; a new starting engine with more power, and simple, single-lever control for easier operation. Track shoes are hardened by the "water-quench" process for longer life than ever.

Get the full facts about the new line of big yellow tractors from your Caterpillar Dealer. He'll give you a demonstration right on your job, and prove the claim of lower maintenance cost with facts. He offers reliable 24-hour service as well as a full stock of Caterpillar parts—parts you can trust. Call him today.

Caterpillar Tractor Co., San Francisco, Cal.; Peoria, Ill., U.S.A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

**NAME THE DATE...
YOUR DEALER
WILL DEMONSTRATE**

SUPERVISING the jobs



EARL JENNET, executive vice president of Guy F. Atkinson Co. (left), receives safety award from **John Drenth**, San Francisco manager of Employers Mutuals of Wausau, in recognition of contribution to safety of employees during construction of Pine Flat Dam. Other partners in the joint venture were Bressi & Bevanda Constructors, Inc., Chas. L. Harney, Inc., J. A. Jones Construction Co. and A. Teichert & Son, Inc. It was emphasized by Drenth that completion of Pine Flat Dam on the Kings River in Central California was instrumental in saving six or more cities in the area from recent flood disaster.

Mel Evenson is project superintendent for Morrison-Knudsen Co., Inc., on construction of seven dormitories and rehabilitation of two buildings at Elmendorf AFB, Alaska. Other key men on this \$3,911,534 project are **Darrel Baker**, project engineer, and **Harry Pursell**, office manager. Subcontracts are in the hands of the following firms: mechanical work, Alaskan Plumbing & Heating Co.; electrical, City Electric of Anchorage; painting, Warren Painting Co.; plastering, Anchorage Plastering Co.; ceramic tile, Robinson Rodel Tile Co., and masonry, Ernest Luckner. Actual work is expected to start June 1, with completion date set for July 1, 1957.

* * *

Jed R. Abbott and **Kenneth Germer**, partners in the contracting firm of Germer, Abbott & Waldron, are directing the recent award to their company for grading and paving 6.7 mi. of the Blue Creek pass in Box Elder County, Utah. **Lawrence Lloyd** is in the crusher superintendent spot, and **Silas Morrell** is job foreman. Work got under way Jan. 3 and the company expects to be finished about Oct. 1. Contract price \$481,350.

* * *

Al Reid is superintendent for Schye

& Sullivan and Riedesel Construction Co. on a bridge being erected across the Yellowstone River at Miles City, Mont. Contractor started the job in November and expects to have it completed about November 1957. Bid price is \$667,000.

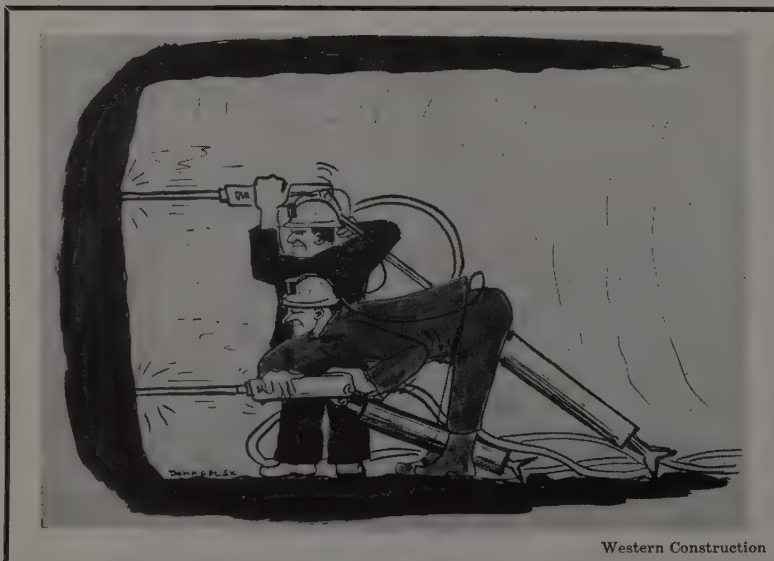
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W. B. Mackey is C. A. Reeves Construction Co.'s superintendent on construction of the Burlington-Meeteetse road in Big Horn County, Wyo., designated as State Project No. SC-CFM 3561. **Ed W. Johnson** is maintenance supervisor on this project which got under way in September and is set for completion in June.

* * *

Fisher Contracting Co., Phoenix, Ariz., is winding up construction of Phoenix terminal for Southern Pacific Pipe Lines. Superintended by **Dick Heinkie** and "**Chuck**" **Kramer**, **Jimmy Dunn** is welding and fitter foreman; **Ed Metz**, equipment; **Les Harris**, labor foreman, and "**Red**" **Copeland**, carpenter foreman. **Tom Bosley** is field office manager. Phoenix is the terminal for an 8-in. line from El Paso, Texas, and a 10-in. line from California. All major oil companies will receive gasoline and diesel from both fields at this station.

Down-time By Domagalski



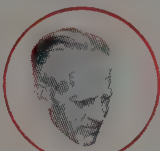
Western Construction

W. C. Smith is project manager for J. H. Trisdale, Inc., contractor on irrigation canal work at Corning, Calif., for the Bureau of Reclamation. **William A. McBryde** is concrete superintendent. **George Nelson** is master mechanic; **Carl Criss** is Cat foreman; **John A. Baker** is loader operator. Inspector on grading is **Dick Gifford**; on concrete, **Dick Charles**. This \$474,500 contract is just finishing.

* * *

Clifford Knox is acting as superintendent for Transocean Engineering Co. on rehabilitation of the Transocean Air Lines office buildings at Oakland Municipal Airport, Oakland, which will soon be ready for occupancy. Other current TEC contracts in California include a nearly completed highway construction in Contra Costa County; a bridge in Humboldt County (temporarily discontinued as a result of high waters), and a new \$350,000 highway job at Hayward.

This contractor is also doing some work on Wake Island in the Pacific for the Civil Aeronautics Administration, consisting of runway paving and warm-up construction. In charge of the work on Wake is TEC Vice President **Harold A. Murphy**. Recently **Harold F. Hudson**, president, spent three weeks at the job site going over the project.



Charles Hastings

"Fewer buying and stocking problems..."



W. E. McKnight

"Misapplication of lubricants a thing of the past..."

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President W. E. McKnight and lubrication superintendent Charles Hastings agree that for day-in, day-out reliability of products and service, it's tough to beat G.P. Prove it for yourself . . . get in touch with your nearby G.P. man today. You'll like doing business with him.



G.P.'s Jack Hanafin

McKnight equipment shown working on residential project for Devon Construction Co., builder of several housing tracts in La Mirada.

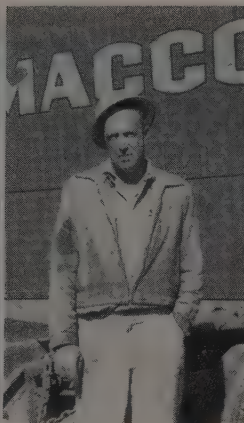


GENERAL PETROLEUM CORPORATION





Cozzolino Allen Mitchell Morris



Casey



Brenner Parr Greene

K. P. "Ken" Morris as general superintendent heads the job personnel working on a freeway project under construction in Oakland, Calif., by Grove, Shepherd, Wilson & Kruge. Involved is the construction of a double-deck, reinforced concrete, box girder structure about 2 mi. long. The California Division of Highways awarded two contracts totaling \$8,239,504 to GSWK, the first in July last year, and the other in January, this year. Job superintendent is **Robert Overman**. Project engineer is **Robert Brenner**, assisted by **Ray Parr**. **Kenneth E. Greene** (formerly assistant editor on the staff of **Western Construction**) and **Larry Dewey** are office engineers, and **Ken Sower**, field engineer. Field office personnel consists of **L. R. Reynolds**, manager; **Gwen Reynolds**, payroll, and **"Kathy" King**, secretary.

Superintending the carpenter crew is **Michael Mitchell**, assisted by **Joseph Zancanelli**, **Barney Holder**, **Keith Boender** and **Starling Cornelius**, foremen. Other important supervisors are **Frank Cozzolino**, concrete superintendent; **Vincent Hunt**, master mechanic; **Carl V. Haley**, operating engineer foreman; **Sherman Allen** and **Vernon Lind**, labor foremen, and **Arthur Barale**, cement mason foreman.

Pile-driving is under subcontract to **Macco Corporation**, with **Vernon Casey** supervising. About 4,500 ft. of **Armco** 12-in. pipe, cast-in-place pile and **H-beams** and **timber piling** are being used in this work which was started in February and will run probably till October.

* * *

Bill Crane, superintendent, **John W. Mills**, project engineer, and **Jim Finn**, office head, are **Rosendahl Corporation's** key men on a multi-million dollar project at **Paramount, Calif.**, being built for **American Brass Co.** Foremen on the structure are **Art Buechle** and **Art Moran**, carpenter; **Chet Bowen**, lay-out, and **Leo Murray**, labor. Preliminary pile work was handled by **Raymond Concrete Pile Co.**

Roland W. Brown is project manager for **M. M. Sundt Construction Co.** which is constructing aprons and runway extensions at **Davis AFB, Tucson, Ariz.**, a \$2,649,957 job just started. Project engineer is **T. M. Sundt, Jr.** Superintendents are **Pat Richardson**, grading; **Charlie Harp**, concrete, and **Billy Gray**, equipment.

* * *

W. J. Clough is superintending **Guy F. Atkinson Co.'s** freeway job in **Ventura, Calif.** **Ted Jones** is engineer. **J. K. Scharf** manages the office, and **Jef Hopfinger** is timekeeper. Other important personnel consist of **Jack Keller**, master mechanic; **K. E. Hydorn**, structures superintendent; **Chris Schneider**, mechanic foreman; **Morris D. Smith**, **Glen Ragsdale** and **Ernest Gressot**, excavation foremen. **Morris Hart** is storekeeper.



CHARLES A. McMAHON, superintendent for **Gust K. Newberg Construction Co.** on the new **Los Angeles County Courthouse** project. Located in the city of **Los Angeles**, contract was awarded to **Newberg** at a cost of **\$19,647,000**.

R. E. Dever, superintendent, aided by **Clyde W. Rossow**, grading foreman, **T. C. Carr**, bridge foreman, and **Paul Taylor**, crusher foreman, is supervising a \$169,652 contract recently awarded to **Armstrong & Armstrong** in **Lea County, N. Mex.** The job, which got under way in mid-February, is for grading, surfacing, and three concrete bridges and miscellaneous work on **State Road 24** from the **Eddy-Lea** county line east toward **Jal.** Contract is expected to be finished this July.

* * *

R. E. Reed, project manager, **Ray Faust**, general superintendent, **E. J. White**, project engineer, and **Ralph Nelson**, office manager, comprise the top personnel on construction of pumping plant additions at the **Hanford Works, Richland, Wash.**, a \$1,869,590 contract in the hands of **Morrison-Knudsen Co., Inc.** Job started in December and will probably run through 1956.

* * *

Oscar K. Kringlen, project manager for **Oberg Construction Corp.**, is in charge of a \$910,694 recent award to this company for grading, paving, one concrete and one steel bridge in **Los Angeles County, Calif.** Excavation superintendent on this job, which started in February and will run till November, is **Nils B. Oberg**. The **Oberg** organization, headed by **Oscar Oberg**, president, and **Seth Oberg**, executive vice president, formerly did business as **Oberg Bros. Construction Co.**

* * *

D. L. Ross is project manager, and **George Borovich** is superintendent on **Thomas Construction Co.'s** recent award for highway improvements in **Placer County, Calif.** Contract price is \$369,953, and includes two reinforced concrete and one steel bridge, grading and paving. Concrete superintendent is **Fred Hunsaker**; master mechanic, **Chris Kinsel**. Work got under way in early February, with time for completion set for the end of November.

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Lanier Wells

Joe Langner is project manager on construction of the Tropicana Hotel, Las Vegas, Nev., a project costing approximately \$7,500,000. Taylor Construction Co. is doing the work, which has been under way since March 1955 and will soon be completed. **C. R. "Whitey" Anderson** is supervising the job, aided by **Ben Pool**, assistant superintendent. Master mechanic is **J. W. Robinson**. Foremen: Carpenter—**Crayton Johnson**, **Diamond Beetley**, **Roy Gribble**, **Grady McKenzie**, and **William Forsman**. Labor—**Bill Wells**; mason—**Gabriel Scherer**, **Ruben Lanier**.

Utah Crane & Rigging has the steel erection, with **W. A. Scott**, superintendent; **M. V. Bell**, general foreman; **W. R. Welker**, carpenter foreman.

* * *

James A. Burton is project manager, and **Charles C. Cheney** and **Presley Cleveland** are superintendents on an award which recently went to **McAttee & Heathe, Inc.**, at \$1,922,558 for taxiway pavement strengthening and runways at **Larson AFB**, **Moses Lake, Wash.**

* * *

Wesley Myers is superintendent for **Clyde W. Wood & Sons, Inc.**, which recently received a contract at \$624,900 for improvement of **Los Angeles River** in the **Los Angeles County** drainage area between **Mari-**

posa St. and Dayton Ave., **Hyperion Blvd. to Blimp St.**, **Los Angeles County, Calif.** **Robert Nutt** is foreman, and **Tom Condon**, timekeeper. Job has been running since mid-February and is expected to be finished this coming May.

* * *

Charles Lewis and **Arthur La Beau** are superintendents for **James P. Johnson**, contractor who recently won an award for work on the **Middle Rio Grande Project** in **N. Mex.** This is a \$147,760 job for channelization near **Espanola**. **W. W. Dean** is project engineer for the **Bureau of Reclamation**. **Johnson** started work here on Jan. 23 and expects to see the job completed by April 14.

* * *

Gordon C. Wiser is job superintendent on a \$303,646 contract of **Peter Kiewit Sons' Co.** and **LeBoeuf-Dougherty Co.** for construction of roadway and a concrete bridge over the **Priest River** in **Bonner County, Idaho**. **George C. Carlson** is in charge of the office. **C. B. Ashby** is pile-driver foreman. The 328-day job got under way in November; by late February the test piles had been driven and precasting dock was in course of construction.

* * *

R. F. Anderson, superintendent, and **V. A. Apted**, assistant superintendent, are bossing the job for **James I. Barnes Construction Co.**, now completing four contracts for

concrete building construction valued at more than \$7,750,000 at the site of **Bakersfield College** at **Bakersfield, Calif.** Carpenter foremen on the job are **C. C. Neighbarger**, **C. T. Rundstrom**, **C. E. Shackelford**, **R. J. Williamson**, **R. M. Apted**, and **C. M. Smith**. Other key men are **T. A. Eastin**, mill foreman, and **R. W. Putman**, labor foreman. Completion date is set at September this year.

* * *

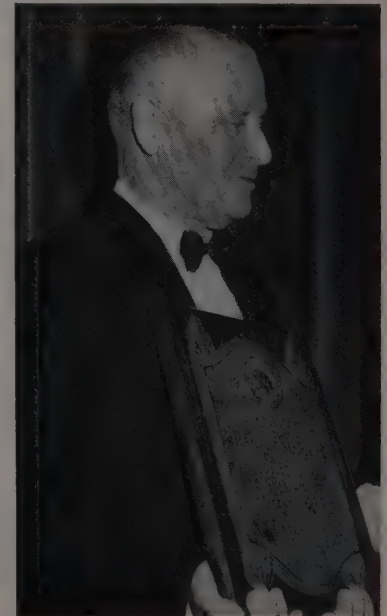
F. M. Stevenson is general superintendent for **M & K Corporation** on a \$761,400 contract from the **California Division of Highways** for a new office building for **District 10** at **Stockton**. **Stan Rebedow** is assistant superintendent on this 3-story reinforced concrete structure. **N. C. Bengtson** is construction supervisor for the State.

* * *

Bob McChesney, general superintendent, and **Maurice Tidwell**, assistant superintendent, head the construction crew on a \$600,000 award to **Stolte, Inc.**, for construction of buildings at the **University of California, Davis**. Assisting on this garage-shop-office project are **Clarke Draper**, **Don Iocsa** and **Johnnie Thiers**, carpenter foremen. **Ray Miller** is inspector for the State.

* * *

Laurie Neilson, project manager, **Evert Seppala**, carpenter superintendent, and **D. Constanti** formed the top trio working on **E. H. Moore & Sons' \$876,000** job of erecting a residence hall and other buildings recently completed for the **University of California** at **Davis**.



HARVEY SLOCUM, the "best dam man in the world" received the non-member **Moles Award** for 1956. He was in **New York** on brief leave from his job of supervising construction of **Bhakra Dam** in **India**.

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TRICKS of the TRADES



Junior Beams for shoring

A NEW shoring technique, devised by J. G. Kassab and Walter R. Wolff, of Ragnar Benson, Inc., Pittsburgh, general contractor, is being used on a new school construction. It involves the use of Junior Beams, lightweight structurals made exclusively by Jones & Laughlin Steel Corporation.

The new building is a steel frame structure with fireproof columns and beams and heavy reinforced concrete slab floors. It will have a 13-story center tower, with 10-story wings and a five-story auditorium and is scheduled for completion late in 1956.

Instead of vertical adjustable supports which hold the concrete forms in position by being braced from the floor below, Ragnar Benson is using these lightweight steel structurals as temporary joists between the steel framework. After the concrete has been laid and is cured, the Junior Beams are removed and used again. Approximately 900 12-in. beams are in use. By using the Junior Beams, large areas are available for forming without depending on shore supports from floor to floor. Their use leaves unimpeded the work areas in the floors below. If conventional shores

were used about nine shores would be needed in each bay of the building. The majority of the bays are 18 ft. wide, with the remainder 20 ft. and odd sizes. The concrete slab flooring varies between 7 and 8½ in. in thickness. The floors are designed for a live load of between 60 and 75 psf., while the average dead load of the concrete slab alone is about 90 psf. Two different lengths of these beams were used. One principal length of fixed joists served the majority of spans, while another length with adjustable ends served the balance of odd span bays.

The Junior Beams, spaced about 4 ft. 6 in. on centers, are held in position by removable steel supports hung from the steel structure. This was necessary due to the heavy concentrated loads. They also are firmly braced at the ¼ points, both at the top and bottom chords to give lateral stability against moving loads. Camber was regulated by the wood nailer attached to the top flange of the Junior Beam. Approximately 560,000 sq. ft. of floor was formed.

With modifications the Junior Beams may be re-used.

Engine care in spring

OPERATING SHOVELS, trucks, tractors, cranes, and other construction equipment in broiling weather puts great demands on the engine cooling system. Unless it is properly serviced for hot weather duty, the result may be an overheated engine, or more serious damage.

Here are some spring maintenance tips from cooling system experts of the Du Pont Company, which manufactures "Zerone" and "Zerex" anti-freezes. These suggestions should help avoid expensive repairs and breakdowns of valuable equipment.

1. Drain out and discard last winter's anti-freeze—including the so-called "permanent" types, since the anti-freeze solution can turn acid after one season's use. Corrosive solutions attack the vital parts of the cooling system, producing rust, which can clog up the radiator and the narrow water passages of the engine block. When the flow of coolant is cut down, the engine quickly overheats.

2. The word "permanent" in anti-freeze means "winter long" or "seasonal"—not year after year. In all permanent anti-freezes, air and exhaust gases seeping into the cooling system oxidize the glycol-forming harmful acids. As these acids are formed, they are neutralized by the inhibitors. In time, however, the rust inhibitors are depleted and the solution becomes dangerously corrosive.

3. Since only an expensive laboratory test can tell if the solution is corrosive, it is more economical in the long run to drain out and discard the worn solution and install fresh anti-freeze in the fall.

4. Don't be misled by hydrometer readings saying the worn solution affords adequate protection against freezing. There is no way the hydrometer can simultaneously indicate that the anti-freeze solution has turned acid and is corrosive.

5. The corrosive process cannot be stopped by adding a fresh "dose" of rust inhibitor to old solutions. New inhibitor will only temporarily ward off corrosive action. It cannot eliminate the damaging acid salts already formed by the chemical breakdown in worn-out anti-freeze.

For these reasons, construction authorities, the National Bureau of Standards and Du Pont anti-freeze experts recommend this program to assure efficient equipment operation during the hot weather:

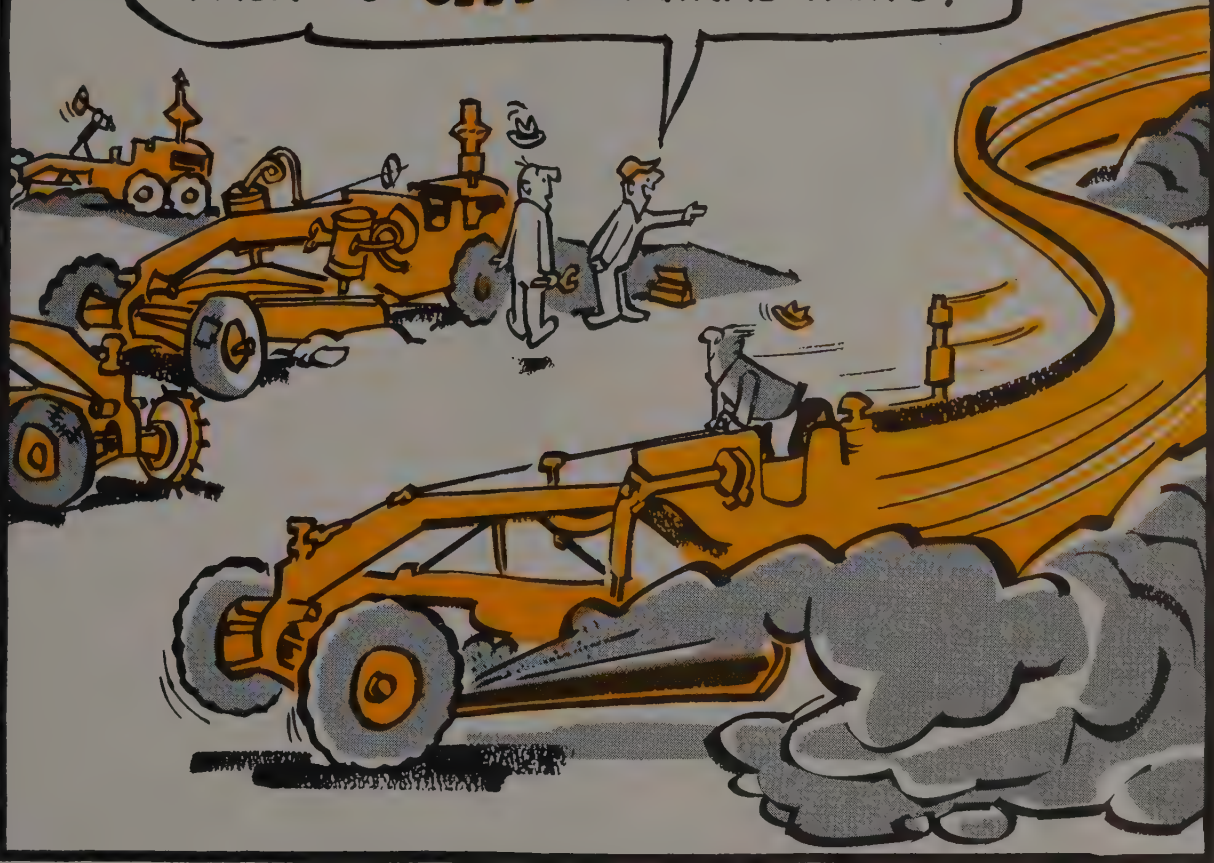
1. Drain out and discard winter-worn anti-freeze solutions from the radiator and engine block.

2. Clean and flush the cooling system, using a chemical cleaner, if necessary.

3. Check all parts of the cooling system for leaks or wear; replace or repair where necessary.

4. Refill radiator with fresh water, and add a chemical rust inhibitor.

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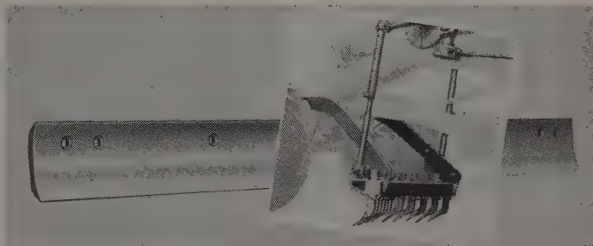
A cutting edge for your CAT* Motor Grader, for example. Caterpillar original cutting edges are made from only top-quality high-carbon steel—carefully pre-tested. Or scarifiers. If they're Caterpillar, the shanks are strong steel forgings mounted in a heavy cast steel block. Their replaceable teeth of forged alloy steel are selectively heat treated to resist wear.

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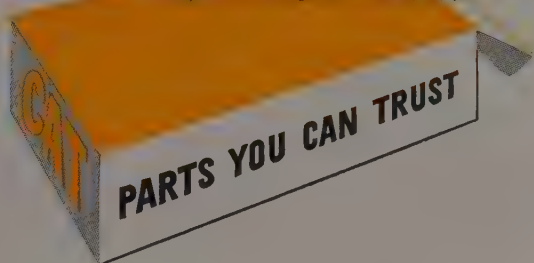
Caterpillar Tractor Co., San Francisco, Calif.;
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Cat original motor grader cutting edges and scarifier teeth are the results of never-ending metallurgical research. They match the all-around performance of the quality machines they work with.

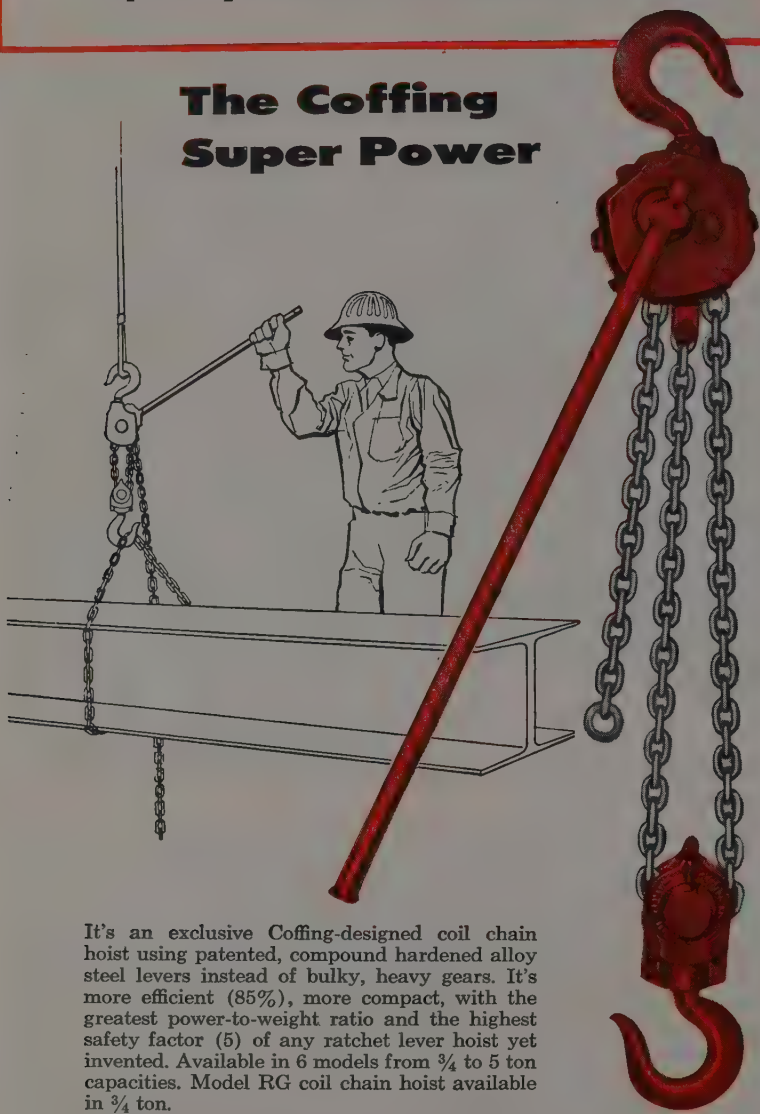
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"Safety valve handle" bends at point of maximum safe overload—may be adjusted for length and operated from either side of the hoist—can't spin out of control should operator's hand slip from handle. Every hoist must withstand the shock of its capacity load dropped in increments of 1" thru 4", an impact load of well over 5 to 1. Ask your Coffing distributor for literature or write for bulletin SP, Coffing Hoist Division, Duff-Norton Co., 811 Walter Street, Danville, Ill.

Branch office: 1016 Howard St., San Francisco, Calif.

COFFING HOISTS

Air Force and AGC

(Continued from page 77)

henceforth what we term "multi-mission" bases. For example, although such a base is primarily used by fighter-bombers, it can also accommodate the tankers and transports which service these smaller planes. Multi-mission bases require pavements that are satisfactory for most any aircraft which may use them.

Air Force dissatisfied

I will not dwell upon certain shortcomings of flexible pavements that have been demonstrated to the dissatisfaction of the Air Force during this period. More powerful engines and increased angles of attack have confirmed and compounded the operational difficulties with jets that were first experienced 5 yr. ago. With appropriate exceptions, it is the Air Force conclusion that only concrete can "take it." An increasing proportion of the total yardage on the multi-mission bases has been classified as critical operational areas, and portland cement concrete prescribed as the type of pavement to be built in these areas. As you may know, Congress interested itself in this matter in 1954 and conducted committee hearings on the problem. In the face of mounting evidence, the Air Force, late in 1955, secured from the Secretary of Defense his approval to incorporate primary taxiways and active runways for combat aircraft into the critical area list, so that our present policy is that the primary use areas involving combat aircraft of the Air Force are to be built of portland cement concrete.

Cost difference often minor

In the implementation of this policy, it is obvious that major changes cannot be made overnight; only seven projects will be affected by next July 1. In the past 5 yr. during which these criteria have been developed, the Air Force has put down possibly 100,000,000 sq. yd. of airfield pavement, half rigid, half flexible; some good and some not so good. It has been demonstrated that the difference in cost between concrete and "black-top" is frequently a minor consideration. The Air Force believes the impact of these criteria upon the petroleum industry and upon large segments of the contracting industry with respect to equipment utilization is much more important. It is with great reluctance that the Department of the Air Force establishes this operational requirement, but, with enough pavement on hand to provide a 90-ft. taxiway from Washington to Moscow, the Air Force feels that this tremendous capital investment may not be further subjected to uncertainties.

LETTERS—

(Continued from page 66)

tained, he might well select vibratory compaction to simplify his operation. On the other hand, the maintenance of such equipment can add to parts stock and maintenance personnel as well as requiring additional capital in his business to own a more expensive piece of equipment.

In closing, I might say that there is need for equipment that will enable the contractor to produce consistently more difficult results being specified today, and that vibratory compaction appears to have many possibilities which have not been fully explored and realized.

D. K. HEIPLE
Chief Field Engineer
LeTourneau-Westinghouse Co.
Peoria, Ill.

SIR:

Regarding your article in the December 1955 issue, on "Vibratory Compaction," there is a question on the relative effectiveness of vibration as compared to a pounding action. In our machines the effect is definitely that of vibration simply because the butts alternate in pounding the ground, and they are in close enough area to cause the particles of sand, soil, or both, to keep moving until they reach a position of maximum density possible under the circumstances.

After all, this is exactly what vibration is, whether it happens to come as a result of pounding or whether it happens to come as the result of rotary motion.

We were first to accomplish exactly what is necessary in non-free draining soils, that is, getting the maximum density with the least amount of effort, both manpower-wise and horsepower-wise as a result of mechanical application.

As pointed out above, the important thing is to get the density, and when you have soils such as non-free draining soils in which, because of the certain sticky characteristics of clays and silts, vibration, as such, from a rotary action as in the case of vibratory compactors described in your article, will not give you the density because of the friction involved in the sticky clay circumstances.

As a result pounding, combined with the continuous movement of the soil particles because of the proximity of the butts pounding, will accomplish the job.

I'm sure that getting the job done is what you are most interested in rather than a strict technical evasion of accomplishment.

EDWARD D. EGAN for
Edward F. Taylor, President
Gunderson-Taylor Machinery Co.
Denver, Colorado



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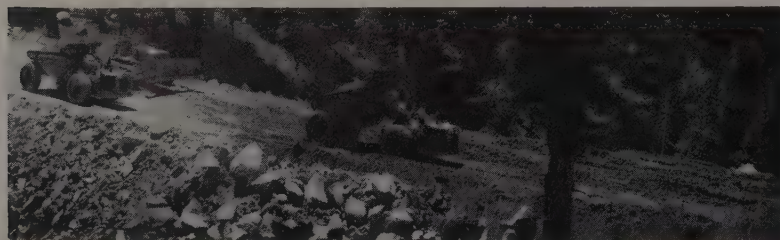
"Giving Industry a Lift Since 1883"

After two calendar years of rocky work—

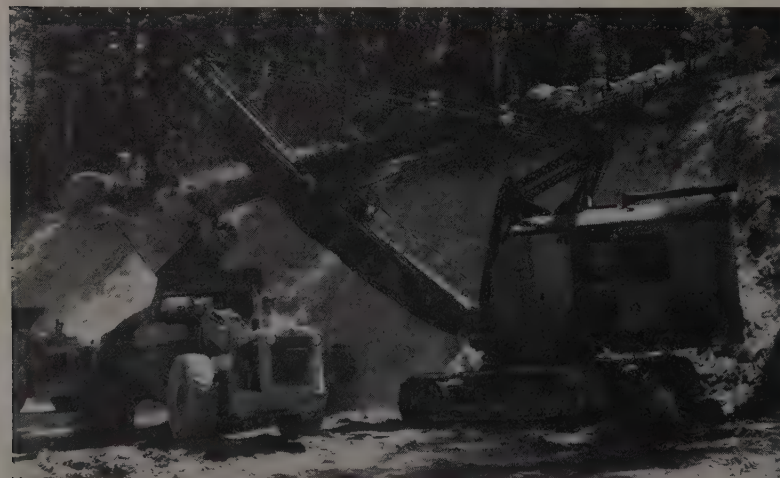
Sonora Pass loses bottleneck



MOST ROCK along the new 9,600-ft. high Sonora Pass road was found in solid cliffs which had to be drilled and blasted. Only a few of the boulders were small enough to be hooked in the angle of the shovel bucket and hoisted into the rear dumps.



FINISHING UP a fill they built earlier of solid granite, the Le Tourneau-Westinghouse D rear-dumps spread a layer of dirt on top. Leveling the loads was a pair of AC HD-19 dozers.



CONTRACTORS Ball & Simpson found very little dirt on the job. Here in the project's final stages some was uncovered by the Northwest 80D as one of the shallower banks was cut back.

WHEN THE SNOWS melt in the Sierra Nevada this spring and traffic starts moving again over Sonora Pass drivers are going to notice that some of the old "thrills" are missing. One of the most dangerous sections of California Route 108—four miles of narrow, twisting, sheer-drop-off, one-way road just west of the summit—has been replaced.

The new section involved moving 800,000 sq. yd. of solid granite, grading, and surfacing. It took three seasons of construction by Ball & Simpson, experienced mountain road builders of Berkeley, Calif., who moved to this project directly after completion of a similar one at Carson Pass.

According to Superintendent E. E. Frost, "This latest job, on the Sonora road, was one of the toughest rock road jobs I have ever seen."

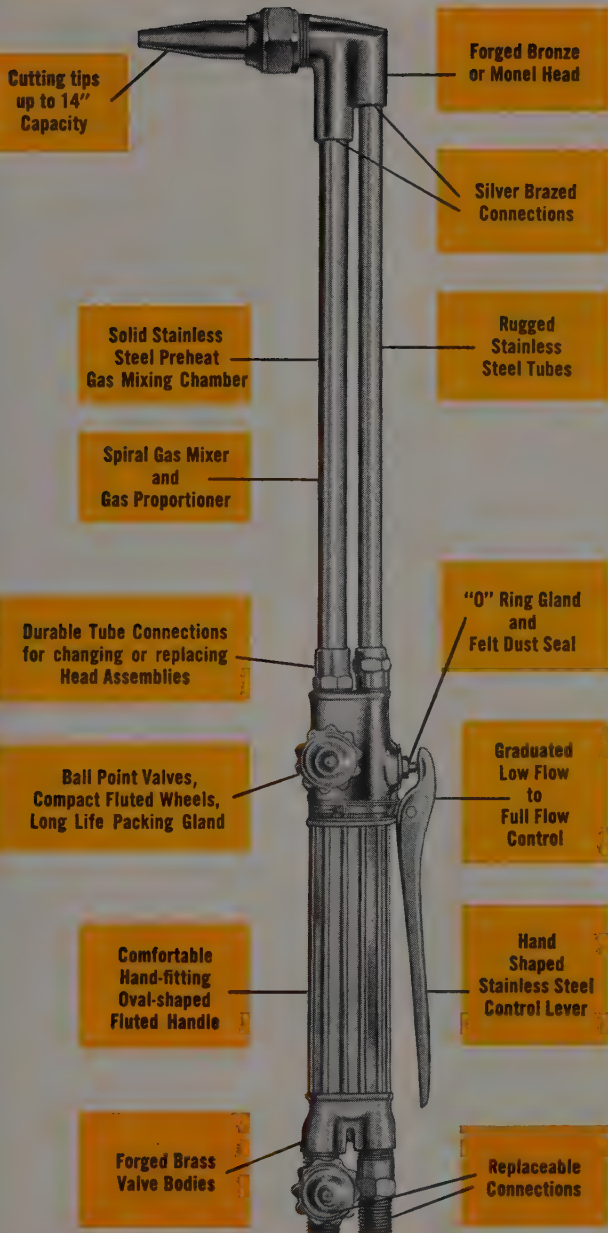
Building the new route to safe, adequate two-lane driving width and eliminating steep grades and sharp curves meant rugged pioneering. It required hewing a road out of solid granite along the side of steep cliffs where a high per cent of the rock had to be blasted before it could be removed.

The going was so tough that only one-fourth of the material could be removed with crawler scrapers and dozers. The remaining 75% had to be taken out by Ball & Simpson's trio of LeT-Westinghouse D rear dumps working in combination with a Northwest 80-D shovel.

Rear dumps ideal

Because the original pioneering of the route involved operation on narrow ledges and fills, Superintendent Frost pointed out that these rear dumps were ideal for the job. Their extreme maneuverability enabled them to operate safely in high tight places which would have been virtually impossible for trucks. Productionwise they did well too, said Frost. As an example he cited one 10-hr. day when the three rigs each delivered 200 loads over a steep 300-ft. haul.

Although the project took two years by the calendar, actual work on it consumed less than half that time. Due to the short season atop 9,600-ft. Sonora Pass they could get in only five or six months' work a year. When snows shut the job down, Ball & Simpson packed up all their equipment and retreated to contracts in areas where the climate was more cooperative. Then in the spring when the snow had disappeared they would tackle the Pass again.



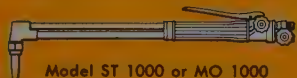
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Note clean lines . . . try its comfortable balance and hand-fitting handle . . . quality construction assures trouble-free performance and ease of repair and replacement of damaged parts.

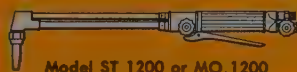
Choice of Monel (MO) or bronze (ST) heads . . . four control lever positions to suit every operator preference and job need. Four lengths: 21", 27", 36" and 48", available with 90°, 75°, 45° (ST Models only) or 180° angle heads.

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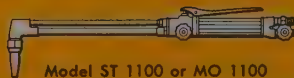
FOUR LEVER POSITIONS



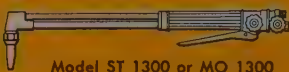
Model ST 1000 or MO 1000



Model ST 1200 or MO 1200



Model ST 1100 or MO 1100



Model ST 1300 or MO 1300

Listed by Underwriters Laboratories, Inc.

For maximum efficiency and safety use genuine Victor tips and parts.

VICTOR
for welding

VICTOR EQUIPMENT COMPANY

Mfrs. of welding & cutting equipment; hardfacing rods, blasting nozzles; cobalt & tungsten castings; straightline and shape cutting machines.

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why gamble
on point performance?

insist on **ESCO**

TESTED POINTS

for... DRAGLINES

DIPPERS

HOE DIPPERS

CLAMSHELLS

FRONT END LOADERS

DOZER ROOTER

RIPPERS



Self-Sharpening ESCO Points are individually Brinell tested to be sure they have exactly the correct degree of abrasion resisting hardness for faster digging and longer life.

ESCO

ELECTRIC STEEL FOUNDRY CO.

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Offices and Warehouses: Honolulu, Hawaii; Houston, Texas; New York, New York; Los Angeles, San Francisco, California; Seattle, Spokane, Washington; Centralia, Pennsylvania; Eugene, Oregon; Salt Lake City, Utah. In Canada: Vancouver, B. C., and Toronto, Ontario.

712 PORTER ST., DANVILLE, ILL.

PUBLIC ROADS

(Continued from page 70)

rent machinery and equipment necessary for repair of the road and approaches thereto and any protecting embankments there may be; and then it is provided that a charge may be made therefor by way of rental, which charge shall include the cost of labor or other necessary expenses in addition to the reasonable allowance for depreciation of the machinery.

In other words, when machinery and equipment are rented, the rental charge is made upon the following basis: (1) the cost of labor, (2) the cost of necessary expenses, which would include materials, and (3) a reasonable allowance for the depreciation of the machinery. The owner of the land over which the road passes should pay, in advance, to the county, an estimate of the cost of the repair or improvement to said road. This estimated cost should be deposited in a trust fund which should be created by the board of supervisors by resolution.

Again, the prerequisite for the use of this section is a four-fifths vote by the board of supervisors determining that the general county interest demands the exercise of the powers.

The more limited authorization of Section 942 of the Streets and Highways Code, discussed above under Private Roads, is also available for public ways.

If the general county interest is not involved, what can the county do? The formation of a special road maintenance district seems to be the answer. The attorney general has stated: "It does not appear to us that the language of Section 1550.1 necessarily limits the use of district funds to roads that are otherwise eligible for general county road money." Whether or not road maintenance districts should be established for this purpose is a policy question.

It is important that public highway departments know those public ways which have been accepted for maintenance and those which have not been accepted. The legality of expenditure of public funds is involved. During an emergency such as the recent floods, numerous demands have been made for public agencies to open and repair public ways that had not been accepted. The public is generally not aware that all public roads are not maintained by government. In addition, questions of liability for dangerous and defective conditions are determined by whether or not the county has accepted the public way into the county highways system.

A paper presented by William M. Siegel, associate counsel, County Supervisors Association of California at the Eighth Annual California Street and Highway Conference.

Costly Downtime Drops!

**"Substantially
lowered
downtime"**

says H. J. Williams,
H. J. Williams, Inc., York, Pa.

"We have a lot of heavy equipment out on turnpike work. If a tire failure stops one of our big rigs, it can cost us hundreds of dollars. That's why we use U. S. Royal Con-Trak-Tors. The way they stand up on tough jobs has substantially lowered downtime for us."

Approach to south portal of T. J. Evans Tunnel, on the Pennsylvania Turnpike near Allentown.

U. S. ROYAL

NYLON
CON-TRAK-TOR
FULL LUG

If, like Mr. Williams, you use heavy-duty trucks, you can reduce your equipment downtime and your operating cost with the U. S. Royal Con-Trak-Tor. Here is why.

This tire's *Nylon cord carcass* stands up to vicious shocks, fights off sharp rocks and snags. It has *triple impact protection*—extra cushioning rubber between plies, double shockpads under the tread, extra-tough construction at the crown.

Its *full-lug traction* pulls right-through toughest going, reduces sideslip to an absolute minimum, just won't bog down.

Your U. S. Royal Dealer now has the U. S. Royal Con-Trak-Tor in your size. Have him put it on your wheels—and prove to yourself why men like H. J. Williams report that both downtime rates and operating costs *drop* with this great tire!



United States Rubber

TOOLS . . .

A NEW SAW TABLE has been announced by Black & Decker Mfg. Co., Towson 4, Maryland, that will convert any of their portable electric saws, from the 6-in. to the 8-in. sizes, into the equivalent of a tilting-arbor bench saw in a few minutes. The table has an aluminum top and steel legs. The top is 22½ in. square on which bevel cuts up to 45 deg. can be made. Additional features are an adjustable mitre gage, and a rip fence that extends the full length of the top. The table stands 32½ in. high and weighs 44 lb.

AN 11-LB. Midget Chain Hoist capable

of lifting 250 lb. has been developed by Coffing Hoist Division of Duff-Norton Co., Danville, Illinois. The hoist has a standard lift of 7 ft. and a minimum distance of 9 in. between hooks. Extra chain is available for greater lifts. Ball bearing trolleys rated at 250 lb. and made to fit all standard 3 to 10-in. I-beams also are available.

A 6½-IN. SAW that will cut a 2x4 with blade to spare, thereby permitting several resharpenings, has been introduced by Black & Decker Mfg. Co., Towson 4, Maryland. It weighs 11 lb. and can be adjusted for depth and angle of cut. The maximum depth of cut is 2 5/32 in. at 90 deg. and 1 7/8 in. at 45 deg.

ACCURATE CUTTING of heavy

gage sheet metals (ferrous and non-ferrous) is possible with a 13-lb. portable nibbler introduced by Fenway Machine Co., Edgemont and Clementine Streets, Philadelphia 34, Pa. Designated Model HN, the machine can handle steel of all types up to 10 gage, and milder steels and non-ferrous met-



als to 8 gage. It will cut contoured or corrugated stock and will follow patterns or templates and will cut them any angle. Minimum cutting radius is 6 in. Speed at full load is 600 strokes per min. Further information is available from the manufacturer.

Sooner or Later

CONTRACTORS OPERATING CUMMER PLANTS PRODUCE ASPHALT TO EXACT SPECIFICATIONS . . . AT A PROFIT!

Busy, successful contractors prefer Cummer Asphalt Plants because they are batch-type. With Cummer Batch-Type Plants the mix is perfectly controlled throughout production.

Mr. J. H. Gallagher, President of the Corvallis Sand & Gravel Co., Corvallis, Oregon, owner of the 50-60 ton per hour capacity Cummer Asphalt Plant, shown above, has this to say: "We chose the Cummer Plant for its compactness and simplicity as well as the adequate strength capacity and standard design of all parts. Since each operation meshes in with the next, our Cummer Plant can be efficiently operated with a minimum of manpower."

Operating Cummer equipment is profitable business because Cummer Plants deliver maximum production with minimum downtime, low operating and maintenance costs and consistent quality.

The new illustrated, descriptive Cummer Catalog gives complete specifications of all models of plants, equipment and accessories. Write for your copy today.

Write now for names of our Western Representatives
THE F. D. CUMMER & SON CO.
 1827 EAST 18th ST. • CLEVELAND 14, OHIO

NOW AVAILABLE from the National Lumber Manufacturers Association is a new 52-page booklet, "Wood Columns, Design and Load Information." A comprehensive guide on the load-bearing capacity of wood columns for use by architects, engineers, and builders, the publication sets forth a new and simplified procedure for figuring how much weight can be supported safely by solid and laminated wood columns under the full range of loading durations, from permanent to impact. Booklet sells for 50 cents a copy and can be had from the National Lumber Manufacturers Association, 1318 Eighteenth St. N.W., Washington 6, D. C.

A NEW "SABERSAW"—hack saw attachment for air or electric drills—has been announced by Thor Power Tool Co., Aurora, Ill.

Designed for use in cutting wood, metal, plastic, etc., the SaberSaw is a small tool for general purpose use.

The Thor No. 567 attachment weighs 3 lb., 3 oz., is 7¼ in. long, and 2½ in. in diameter at its widest point.

Features include the fact that it has no gears, operating with an all ball-bearing reciprocator which whips the blade back and forth; blades may be easily changed by loosening only two set-screws; rifle-sight pointer and steady rest rocker permit accurate cuts; fits any air or electric drill of ¼-in. or more capacity.

A wide selection of SaberSaw blades for key-hole cutting, scroll cutting, and hack sawing are also offered.

CALL ANY OF THESE FRUEHAUF BRANCHES FOR FULL INFORMATION ON FRUEHAUF CONSTRUCTION UNITS

Billings, Mont. Branch
1518 1st Avenue North
Phone: 5-5169

Denver, Colo. Branch
4780 Vasquez Boulevard
Phone: Alpine 5-1793

Fresno, Cal. Branch
2550 Church Street
Phone: 4-6551

Los Angeles, Cal. Branch
1444 So. Alameda Street
Phone: Richmond 7-6181

Oakland, Cal. Branch
850 Ninety-second Avenue
Phone: Lockhaven 9-3333

Phoenix, Ariz. Branch
902 South 7th Street
Phone: Alpine 8-6961

Portland, Ore. Branch
16700 S.E. McLoughlin Boulevard
Phone: Olive 4-5461

W. Sacramento, Cal. Branch
3600 West Capitol Avenue
Phone: Gilbert 3-3906

Salt Lake City, Ut. Branch
1082 South 2nd Street West
Phone: Elgin 9-3721

Seattle, Wash. Branch
2411 Sixth Avenue South
Phone: Mutual 0487

Spokane, Wash. Branch
West 1107 Third Avenue
Phone: Madison 9151

**EXACTLY THE RIGHT DESIGN
FOR TOP PAYLOAD
IN YOUR STATE!**

Safety wears a hard hat

IN 1953, the Pacific Power & Light Company inaugurated a new program of head protection for its line crews and provided these crews with hard hats.

Ten days after the protective hard hats were issued, Clifford Anderson, a groundman, was knocked sprawling by a large tree branch that fell from a tree which was being trimmed. He was stunned, but his head cleared in a few minutes, and his injuries proved to be minor. The attending physician said the protective helmet, an MSA Shockgard, undoubtedly saved Anderson from a skull fracture.

Since that time the Pacific Power & Light Company has expanded its hard hat program to include all linemen and groundmen, and others exposed to vertical hazards in its entire system. This system includes major electric utility operations in the states of Oregon, Washington, Idaho, Montana, and Wyoming. The program has proven conclusively that several lives have been saved.

A line crew foreman, George Zirr, had not been "sold" on wearing a hard hat until an experience convinced him of its value. George was driving from Portland, Ore., to Tillamook one evening when he had to get out of his car to make a minor motor adjustment. Because it was raining heavily, he wore his MSA Shockgard, which was lying on the back seat. After completing the repair, he drove on toward Tillamook, still wearing the hard safety hat. Suddenly a curve loomed ahead, and his car rolled down an embankment, turning over several times. George was found unconscious on the ground, his car several hundred feet below. Beside him was his helmet. It had been crushed and torn. George

feels certain that the hat saved his life.

More recently, Lester Long, an equipment operator, was saved because his hard hat stopped the blow of a 15-lb. coffering hoist which fell 30 ft. from a lineman's hands. Though temporarily stunned, Long did not lose consciousness or time from his job.

One of the most attractive, readable, and effective safety manuals in the public utility field is the pocket-size employee's booklet prepared—characteristically—by a joint safety committee made up of PP&L journeyman linemen, a line superintendent, the chief dispatcher of the power department, and the safety director.

First portions of the manual clearly define the safety rules and regulations, and the responsibility for observance on the part of the company, its foremen, and other operating supervisors, and the linemen and other employees.

Later sections spell out the rules for use, care, and application of protective equipment, guards and barriers, and hot line tools; precautions and procedures for grounding and working on energized lines; stringing or removing conductors; series street light circuits; high-line telephones; crew make-up and size for various jobs; use and care of tools and equipment as they affect safety; transportation; restrictions on radio transmitters in the vicinity of blasting circuits; handling of explosives; trailers and power-operated equipment—winches, trucks, cranes, tractors; underground operations, dispatching and clearance rules for various kinds of jobs; and a closing section on safety at generating stations and substations.



BATCHING PLANT-ON-WHEELS permits ready-mix supplier to successfully bid Crown-Zellerbach job 21 mi. from base and makes it pay. H. W. "Heine" Gentry Co., Walnut Creek, Calif., batches at Antioch job site where short hauls for mixer trucks increase production and reduce costs. Plant, known as Noble-Mobile, batches automatically, is driven on highway to job site, goes quickly into production with no field wiring, footings or crane time required on base plant. Ten-in. wheels are dismounted for use on truck mixers. Manufactured by The Noble Company, 1860 Seventh Street, Oakland 20, Calif.

**New
HOMELITE
EZ**



...the Direct-Drive CHAIN SAW with ALL of the features YOU want

**Only 19 pounds
Full 5 Horsepower
New Low Cost
Faster Cutting Speeds**

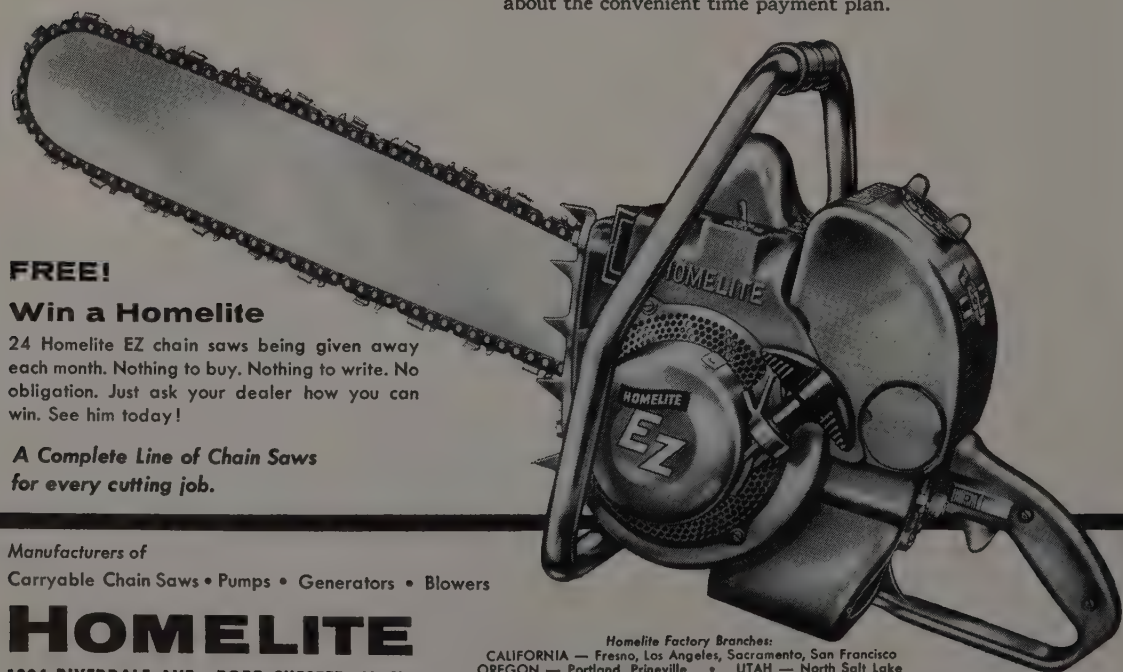
AND WITH THE NEW HOMELITE FLOATING POWER, you'll find handling ease you never knew before. The all-angle, any-position carburetor gives you full power cutting — whether you're felling, bucking, notching, limbing or under-cutting.

Floating Power lets you cut with less effort, less fatigue than any other chain saw. Because the Homelite EZ weighs only 19 pounds you can carry it anywhere. Its full 5 horsepower cuts through 8" Oak in 5 seconds and 18" Pine in 14 seconds. And the three bar sizes — 17", 21" and 25" will handle trees up to 3 feet in diameter.

The EZ brings you Homelite dependability at a new low cost — not just a low initial cost, but also lower maintenance and operating costs than any other direct-drive chain saw.

See this new floating power now! Try it and you'll know why the Homelite EZ offers easier cutting, faster cutting, more profitable cutting for your dollar.

Ask your Homelite dealer for a free demonstration. Also ask about the convenient time payment plan.



FREE!

Win a Homelite

24 Homelite EZ chain saws being given away each month. Nothing to buy. Nothing to write. No obligation. Just ask your dealer how you can win. See him today!

**A Complete Line of Chain Saws
for every cutting job.**

Manufacturers of

Carryable Chain Saws • Pumps • Generators • Blowers

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Homelite Factory Branches:

CALIFORNIA — Fresno, Los Angeles, Sacramento, San Francisco
OREGON — Portland, Prineville UTAH — North Salt Lake
WASHINGTON — Seattle, Spokane

Canadian Distributors:

Terry Machinery Co., Ltd., Toronto, Montreal, Vancouver, Ottawa, Edmonton, Moncton

NEW LITERATURE

Sched-U-Graph job planning

A 16-page catalog is available from Remington Rand describing the use of a new aluminum Sched-U-Graph, which is a display board designed to show both planned and actual work through a variety of signals and operations cards. The unit can be adapted for planning control on construction jobs indicating the relation of different operations and time elements. A change in scheduling requires only an adjustment of the cards and signals. The catalog is available from any Remington Rand sales office, or by writing direct to **Remington Rand**, 315 Fourth Avenue, New York 10, N. Y.

Power-lift for tail-gates

Features of the Load-N-Gate are described in a leaflet announced by Hercules Steel Products Co. Information is provided on both electric-hydraulic and power take-off driven models of 110-lb. capacity. Operation controls and construction features are described along with suggested applications and condensed specifications. Copies of Catalog 152 may be secured from local distributors or by writing directly to **Hercules Steel Products Co.**, Galion, Ohio.

Rolled or cut threads?

The difference between rolled and cut threads and other related information is contained in a descriptive sheet just published by Bethlehem Pacific. A handy table is provided which compares various standard rod sizes and shows the weight savings possible when rolled threads are used instead of cut threads. Copies of the informative sheet may be secured from **Bethlehem Pacific Sales Offices** in Seattle, Spokane, Portland, San Francisco, Los Angeles, or Phoenix.

On rails or crawlers

A crane that operates on railroad track or on its own crawlers is reviewed in an 8-page bulletin released by Koehring Co. which also describes its other equipment particularly adapted to construction and railroad work. This includes several sizes of crawler-mounted excavators, Dump-hauling units, the Moto-Bug wheelbarrow, and trenching equipment. Write to **Koehring Co.**, 3026 West Concordia Avenue, Milwaukee, Wis., for a copy of the new Railroad bulletin.

Safety in handling explosives

An up-to-date list of the instructions and the warnings that should be observed in handling explosives and

Splicing wire rope

Detailed information on splicing and fitting wire rope, including sections on making a tuck, blocking and serving, and several types of splices, is contained in a 32-page book just released by **E. H. Edwards Co.** Step-by-step photographs and drawings illustrate correct methods and include all of the details. Sections also discuss the handling of eight strand ropes and the attaching of grommets. The handbook can be secured by writing **E. H. Edwards Co.**, Butler Road and Industrial Way, South San Francisco, Calif.

blasting supplies has just been released by the Institute of Explosive Makers. The 4-page bulletin lists 72 do's and don'ts that should be observed while transporting, storing, handling, loading, or tamping explosives. Approved methods for priming with both cap and fuse and with electric blasting caps are described and illustrated. Single copies may be obtained directly from **Technical Division, Atlas Powder Co.**, Wilmington 99, Del.

Guniting a dome roof

Methods used in guniting a dome-shaped roof slab 106 ft. in diameter and 20 ft. high are described and pictured in some detail in a 4-page bulletin just released by the **Gunite Contractors Association**, 714 West Olympic Blvd., Los Angeles 15, Calif. Ask for Bulletin 126.

Fasteners for roofing and siding

New type fasteners for making leakproof application of roofing and

Prestressed concrete structural members

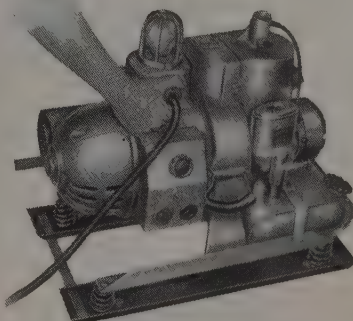
A complete folder is available from **Ben C. Gerwick, Inc.**, including several bulletins which describe and present characteristics of prestressed concrete piles and structural members for buildings. The latter includes information on dimensions, weights, and serial numbers to permit ordering of any factory produced element called for in design. The folder is available from **Ben C. Gerwick, Inc.** Precast-Prestressed Concrete Division, 112 Market St., San Francisco 11.

CHOOSE
from a full line of
HOMELITE
Carryable
Construction
Equipment



SELF-PRIMING CENTRIFUGAL AND DIAPHRAGM PUMPS

Sizes: 1½" to 3" — capacities to 15,000 g.p.h. for dewatering and water supply.



ELECTRIC GENERATOR SETS FOR TOOLS AND LIGHTS

Complete range of sizes and voltages up to 5,000 watts.



LIGHTWEIGHT POWERFUL ONE-MAN CHAIN SAWS

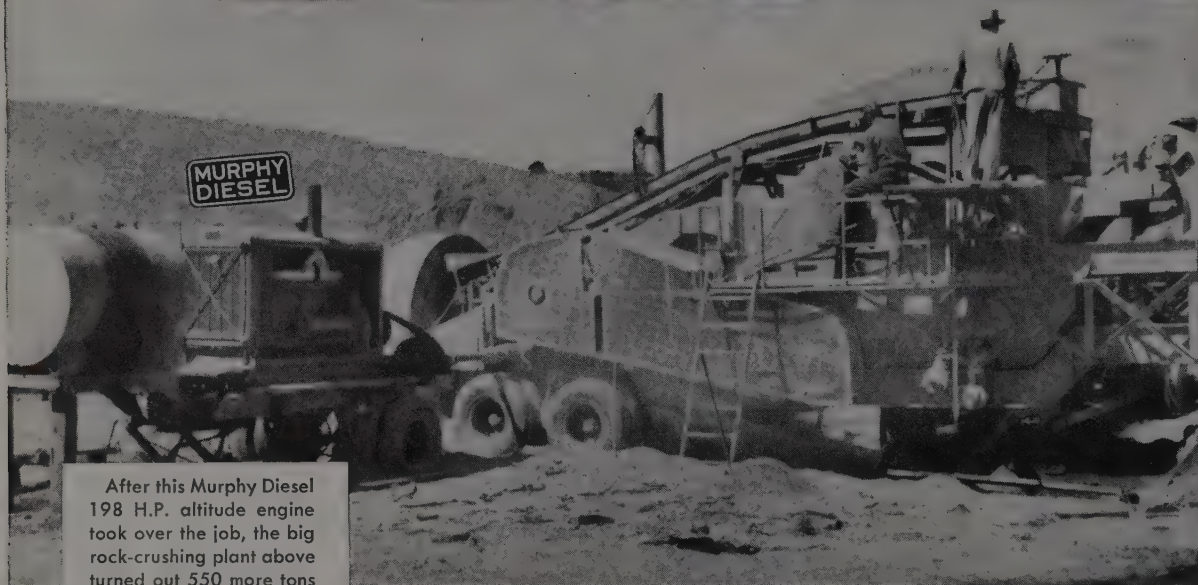
Complete line of saws with clearing and brushcutting attachments for every woodcutting job.

HOMELITE

A DIVISION OF TETRON-AMERICAN, INC.
PORT CHESTER, N. Y.

550 more tons per day ...
since they repowered with

MURPHY DIESEL



After this Murphy Diesel 198 H.P. altitude engine took over the job, the big rock-crushing plant above turned out 550 more tons per day than with any previous power. Operating in Colorado at a 7000-ft. elevation, the Murphy-powered plant is making extra profit for its owner.

MURPHY DIESEL

HEAVY-DUTY POWER for Construction

Murphy Diesel engines and power units are available in sizes from 96 to 264 H.P. with engine speeds of 1200 and 1400 rpm. "Packaged" generating units are available with capacities ranging from 64 to 165 K.W.

• Profitable aggregate production depends on the power that drives your crushing plant. Take it from the owner of this Cedarapids Master Tandem who increased production *and profit* by repowering with a Murphy Diesel. Whether you're operating high in the Rockies, or deep in a quarry, take advantage of Murphy's greater fuel economy, longer trouble-free life, and dependability unmatched by any other engine of comparable size.

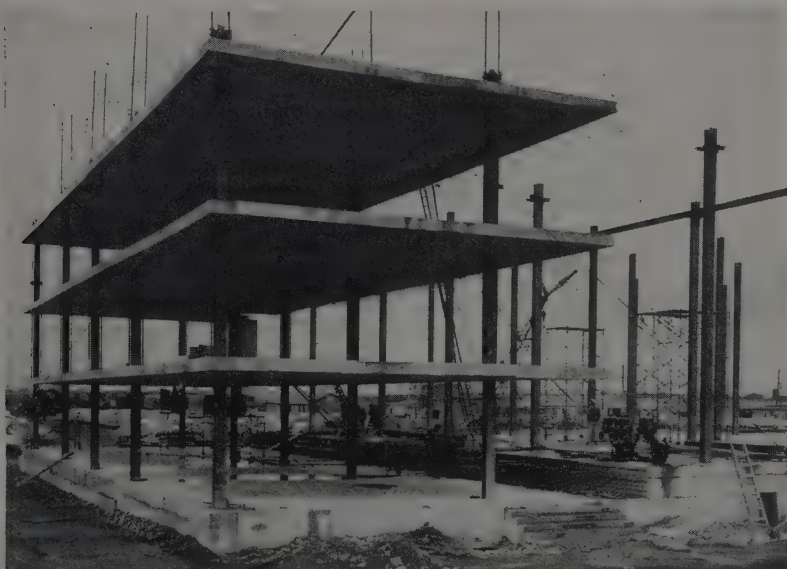
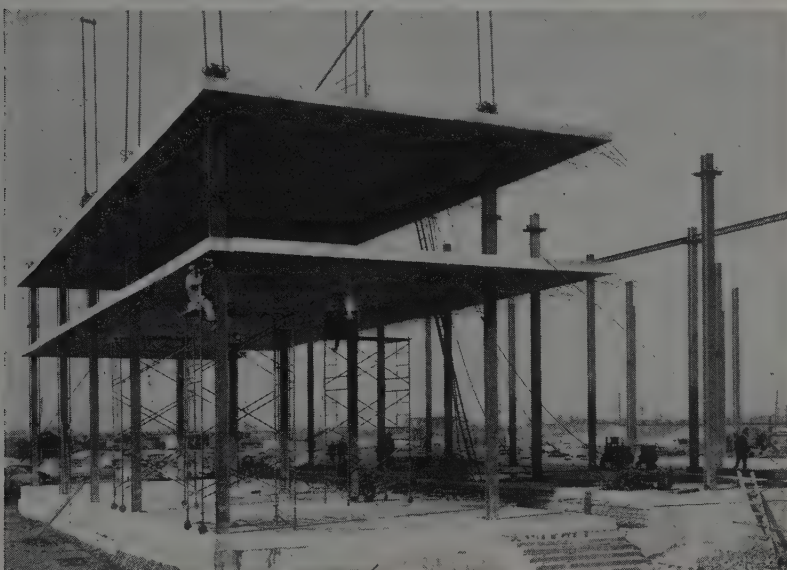
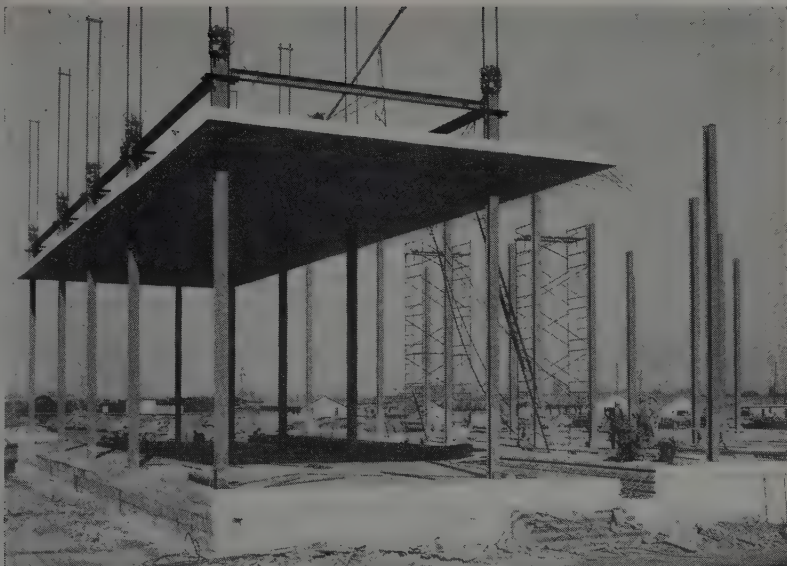
Ask producers who own Murphy Diesels to give you their opinion about the power that assures more profitable production from any plant—then ask your Murphy Diesel dealer to show you what a difference Murphy can make in your operations.

MURPHY DIESEL COMPANY

5325 W. Burnham St., Milwaukee 14, Wisconsin

348

Superior Equipment Co., 2221 S. 19th Ave., P. O. Box 6325, Phoenix, Arizona
National Steel & Shipbuilding Corp., Harbor Drive at 28th St., San Diego 12, Calif.
Arnold Machinery Company, Inc., 433 West Second South Street, Salt Lake City 1, Utah
Balzer Machinery Company, 2136 S. E. Eighth Avenue, Portland 14, Oregon
Engineering Sales Service, Inc., P. O. Box 851, Boise, Idaho
Industrial Engine Service, 5315 Valley Boulevard, Los Angeles, California
Lively Equipment Co., 2601 Fourth St., N. W., Albuquerque, New Mexico
Oswald Machine Works, 2936 Hyde Street, San Francisco 9, California
Glenn Rose Engine Service, 502 South Real Road, Bakersfield, California
General Machinery Company, E. Station B. Spokane 31, Washington
Hall-Perry Mach. Co., 812 East Iron St., Butte, Montana



Goes up 20% faster this way

To erect a new 370,000 sq. ft. office building for the manufacturing divisions at Ford Motor Company's Rouge plant, in Dearborn, Mich., Long Construction Company of Kansas City used the lift slab method shown here.

The double "T" shaped building was divided into 28 "lift sections". Reinforced concrete slabs for the roof and floors of each lift section were then poured in one form at ground level. A sprayed-on resinous film kept the slabs separated and steel collars were embedded in their concrete around the supporting columns.

When hardened, the 400-ton slabs were raised in sequence, at about 4' per hour, by hydraulic jacks atop the columns. Welding the embedded steel collars to the columns then fixed each of the slabs in place.

The builders estimate more than 20% saving in construction time by this method. One great advantage is the economy of pouring all slabs at ground level, using mobile truck mixers of certified design, capacity, mixing speed and accuracy of water control.



You have a right to insist on this Rating Plate. It certifies compliance with the high industry standards maintained for your protection by the Truck Mixer Manufacturers Bureau.

BLAW-KNOX CONSTRUCTION EQUIPMENT DIV.
Mattoon, Ill.

CHAIN BELT COMPANY
Milwaukee, Wis. and Los Angeles, Calif.

CHALLENGE MANUFACTURING CO.
Los Angeles, Calif.

CONCRETE TRANSPORT MIXER CO.
St. Louis, Mo.

CONSTRUCTION MACHINERY CO.
Waterloo, Iowa

THE JAEGER MACHINE COMPANY
Columbus, Ohio

THE T. L. SMITH COMPANY
Milwaukee, Wis.

WILLARD CONCRETE MACHINERY CO., LTD.
Lynwood, Calif.

WORTHINGTON CORPORATION
Plainfield, N. J.

siding materials are described in a 4-page folder just released by **Townsend Co.**, Box 237-2, New Brighton, Pa. The folder provides details on the design of these fasteners which provide a water-tight seal in attaching aluminum, galvanized, or steel sheets. Recommendations are made to indicate the proper location of the fasteners, torque settings for the wrenches and a complete table of specifications and sizes.

Timber with the Teco system

Profusely illustrated with job photographs, a 24-page booklet has been released by **Timber Engineering Co.**, 1319 18th Street, N.W., Washington 6, D. C., showing applications of timber framing to all types of buildings, including stores, factories, warehouses, and recreational buildings.

Hose connectors and accessories

Accessories for connecting industrial rubber hose in water and petroleum applications with a variety of steel and brass devices is reviewed in a 4-page bulletin just released by the Le-Hi Division of **Hose Accessories Co.** Ask for Bulletin 105 from **Hose Accessories Co.**, 2700 North 17th Street, Philadelphia 32, Pa.

Asphaltic protective coatings

A new 8-page bulletin illustrates and describes the uses for Laykold Weathercoat, a cold-applied asphaltic composition to secure a durable protective coating in refineries, chemical plants, power stations, and other applications. The product is described as being compounded from selected asphalts and has a high resistance to moisture in all forms. The material is also adapted to the lining of reservoirs. The bulletin describes and illustrates typical installations with accompanying data. Copies may be secured from **American Bitumuls & Asphalt Co.**, 200 Bush Street, San Francisco, Calif.

Oshkosh Ready Mix concrete carrier

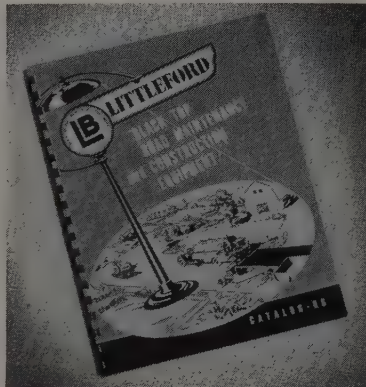
Specially designed to carry the largest possible payloads the Oshkosh 50-50 Ready-Mix Concrete Carrier has an 18,000-lb. weight when loaded on each axle, conforming to legal load limits in most states. The unit is engineered specifically for the ready-mix concrete industry and carries 5 cu. yd. of concrete with some models of mixers. Overhang of the engine balances the load on the axles and helps in maneuverability. The 8-page folder on this new unit is available from **Oshkosh Motor Truck, Inc.**, Oshkosh, Wisconsin.

Hydro-Spring on Drott shovel

Advantages of the exclusive Hydro-Spring feature on the International Drott skid shovel are described in a new 4-page bulletin. This feature acts as a shock cushion increasing the life of the equipment and its capacity. It is offered in the 4 skid-shovel sizes ranging from 1 to 3 cu. yd. using International crawler tractors from TD-6 up to TD-18 size. Copies of the folder describing the Hydro-Spring can be secured from **International Harvester Co.**, Consumer Relations Dept., 180 No. Michigan Ave., Chicago 1, Ill. Ask for Form CR-403-F.

Highway maintenance equipment

Just revised, a 36-page catalog titled "Black Top Road Maintenance and Construction Equipment" has been released by **Littleford Bros., Inc.**, Cincinnati, Ohio, covering the entire field of highway and road maintenance machines and accessories. The



catalog describes and illustrates such items as pressure distributors, supply tanks, sprayers, brooms, asphalt kettles, and accessory tools.

These engineered units are the result of the company's more than fifty years in the building of heating and applying devices for all types of bituminous material. The catalog GG may be secured from **Littleford Bros., Inc.**, Box 100-502, East Pearl Street, Cincinnati 2, Ohio.

Portable batching bins

Bulletin PC published by **Erie Strayer Co.**, Erie, Pa., describes a new model batching bin. The bins can be arranged for aggregate only or for aggregate and cement, as well as with additional ground storage facilities. The bins are made in two and three sections with two-piece platforms. Detachable columns and braces further reduce space requirements for transportation and storage and make erection and take-down easier. Top section of all compartments is in one piece. Cement compartments are weather-tight.

Trenchliner catalog of Parsons Co.

A 16-page catalog well illustrated and complete with specifications reviews the lines of Trenchliners of the Parsons Co. which is a subsidiary of Koehring Co. in Milwaukee. A special feature of the new models is the application of hydraulic power for raising and lowering the digging wheel. Drawings in the catalog describe this power system. Digging depth is listed at 5 ft. 9 in. with widths from 16 to 26 in. The frame is all welded and gears move in oil baths with sealed shafts. Copies of the catalog are available from **Parsons Co.**, Newton, Iowa, or any distributor.

Wheeler-economy pumps

An 8-page bulletin describes and illustrates the Wheeler-economy type M pumps designed for medium and high head services. Illustrations include cross-sections of the design and the construction details. Advantages of high efficiency and low maintenance costs are described. Copies of the well illustrated bulletin may be secured by writing **C. H. Wheeler Manufacturing Co.**, 19th and Lehigh, Philadelphia 32, Pa. Write for catalog A-155.

Scaffolds for construction

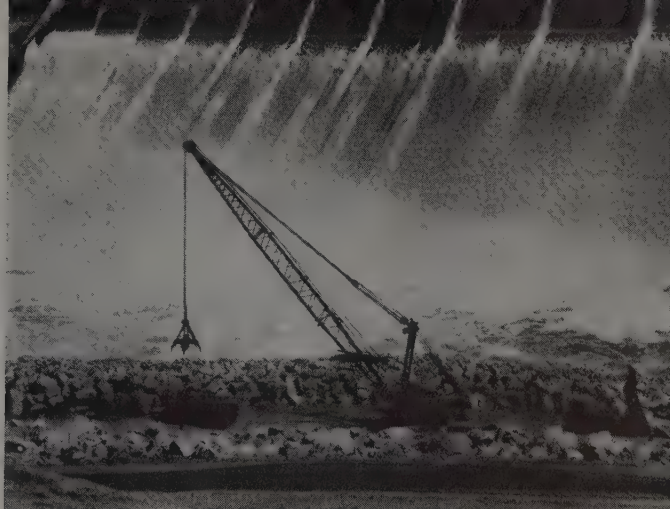
45-job photographs are the feature of a new 8-page review showing the use of modern scaffolds in construction. This is the quarterly issue of **Scaffolding Methods** put out by **The Patent Scaffolding Co., Inc.**, 38-21 12th St., Long Island City 1, N. Y. The illustrations show means of cutting costs on construction jobs by the use of steel and aluminum scaffolds including the use of these units for shoring. Copies of the booklet may also be secured from the company address at 6931 Stanford Ave., Los Angeles 1, Calif.

Blasting without dust

Features of the Educt-O-Matic are described in a 4-page bulletin describing the use of this machine which uses common blasting abrasives and removes them by vacuum action as the machine cleans a 1½-in. width of material. The unit will equal the production of three men hand-cleaning, requires no skilled labor and no setup time. It re-uses the abrasives through a continuous cycle. The bulletin may be secured from **Clementina Ltd.**, 2277 Jerrold Ave., San Francisco 24, Calif.

Portable electric plants

Portable electric generating plants available for small containers are reviewed in a 4-page brochure which

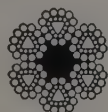


PROVING EXTRAORDINARY SERVICE—A Hercules Flattened Strand crane rope delivered 18 months service, compared to 6 months for ordinary rope. It performed equally well as a clamshell bucket rope. On a hot ladle

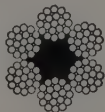
crane it outlasted round strand rope by 4 to 1, and still tested at higher-than-rated strength. It was chosen for its super strength to haul the car on the continent's largest cableway at Kitimat.

Can Flattened Strand solve your special wire rope problem?

Hercules Flattened Strand is a special kind of wire rope that provides extraordinary service on special kinds of jobs.



Flattened Strand



Round Strand

The key to the difference is the triangular shape of the strands. Notice how the strands support each other; how the rope circumference is almost perfectly round; and how the core is smaller. There is 10% more steel in Hercules Flattened Strand than in round strand ropes of the same diameter. That means *10% more strength* and *10% greater safety*. Flattened Strand wears longer and more evenly . . . and is easier on sheaves and equipment.

If you can use this Super-rope, you'll soon begin saving time, labor, money. Why not investigate?

Because Leschen pioneered and perfected Hercules Flattened Strand wire rope, Leschen is your best source of additional information. Ask your Leschen man, or write for "The Flattened Strand Story."

LESCHEN WIRE ROPE DIVISION

H. K. PORTER COMPANY, INC.

St. Louis 12, Missouri



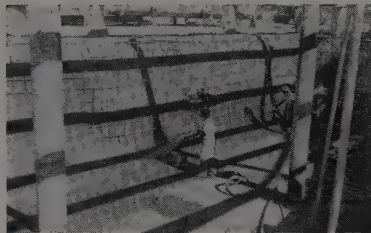
Whatever Your Concrete Gunning Needs

AIRPLACO

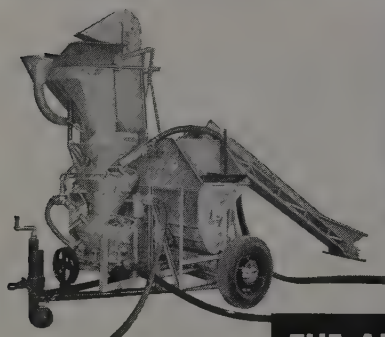
Equipment Will Fill the Bill...



MAINTENANCE



CONSTRUCTION



RESTORATION

THE AIRPLACO PORTABLE RIG

MAKES ANY CONCRETE JOB

EASIER • FASTER • BETTER • MORE PROFITABLE

The AIRPLACO Portable Rig combines speed, efficiency, portability and economy to give you the most profitable operation. The rig consists of a job-proved BONDATOR* or NUCRETOR* (NUCRETOR shown in photo) for better concrete gunning. The time-saving MIX-ELVATOR for automatic proportioning, continuous mixing, elevating and screening of materials. And the AIRPLACO SAND-LOADER for a big time and labor savings in loading sand into the unit. The rig can be towed easily and quickly from one job site to another with a minimum of set up time required.

AIRPLACO concrete gunning equipment is available in a wide range of sizes to meet your production and job requirements from ½ to 7 cubic yards of aggregate per hour, and using air compressors with 75 to 600 CFM capacity.

*registered trade names

**See These Distributors for
Free Catalog**

EDWARD R. BACON CO.
San Francisco, Fresno,
Oakland, Sacramento

A. H. COX & CO.
Seattle, Tacoma

**OREGON RENTAL & EQUIP.
SALES CO.**
Portland

SMITH BOOTH USHER CO.
Los Angeles

WESTERN MACHINERY CO.
Phoenix



WESTERN MACHINERY CO.
Denver, Grand Junction

WESTERN MACHINERY CO.
Salt Lake City, Idaho Falls

describes the entire new line recently announced by **D. W. Onan & Sons, Inc.**, Minneapolis, Minn. The single-cylinder models range from 500 to 2,500 watts in capacity and the two-cylinder plants have sizes of 3,500, 5,000 and 10,000 watts. Complete technical information and specifications on both engines and generators are provided. On-the-job photographs illustrate the use of these units. Ask for "Construction Bulletin" Form A-406.

"Why Cat Diesels Are Best"

This is the title of a 16-page booklet just made available by Caterpillar Tractor Co. Made for rapid reading the booklet outlines some of the features built into the Cat diesel engine. It emphasizes the advantages of diesel over gasoline engines and those which distinguish Cat. The turbo-charger is discussed and illustrated. This booklet numbered DE605 may be obtained from **Caterpillar Tractor Co.**, Peoria, Ill. or any Caterpillar dealer.

"Spec" sheets on new graders

A new 16-page bulletin and complete specification sheets provide detailed information on the two new motor graders of **Huber-Warco Co.** Model 6-D is powered with a 102-hp. engine and Model 7-D is a 140-hp. unit. The bulletin No. HWG-521 covers the outstanding features of both machines which are similar in design. A special section reviews the history of this common piece of grading equipment illustrating the first motor grader and the first grader with hydraulic controls, both introduced by W. A. Riddell Corp., now part of Huber-Warco Co. Ask for bulletin HWG-521 and the spec sheets on the 6-D and 7-D models from any Huber-Warco distributor or they may be secured by writing the company at Marion, Ohio.

The crawler in construction

Facts on the construction industry indicating the volume of various classifications in 1954 and 1955 are part of the valuable information included in a new 12-page booklet just released by **American Tractor Corp.**, Churubusco (Ft. Wayne), Ind. The booklet illustrates and describes how the company's 30 to 60-hp. TerraTrac tractors fit into this construction picture. Illustrations show the complete tractor line of the company including five gasoline and three diesel-powered tractors with matching equipment. Copies of the booklet may be obtained from any TerraTrac dealer or by writing directly to the company. Complete title of the booklet is "The Crawler . . . Backbone of Construction."

Trailers of all types

Low-bed trailers as well as several other types common in the construction industry are reviewed in a new

Athey

MONEY MAKERS



◀ BIG ADVANTAGES IN TRACTOR-TRAILER MANEUVERABILITY

Athey-Cat Tractor Trailer maneuverability permits Athey PR21 to get into narrow quarters, take sharper turns at higher speeds, and dump faster with less maneuvering than rigid frame haulers.

▶ FASTER LOADING, LESS SPOTTING TIME

Athey 125 HiLoader full-floating feeder digs into stockpile or windrow, loads 10 cu. yds. of material per minute. Swiveling conveyor loads trucks to rear or either side, saves spotting time.

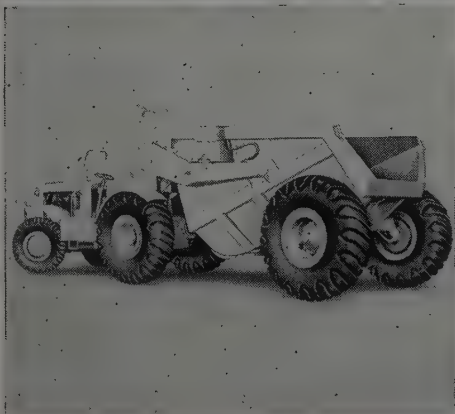


◀ FASTER CYCLES WITH NON-STOP DUMPING

"On-the-go" dumping and high speeds clip cycle time, provide more economical one-way traffic, increase production with Athey PD20. Stabilizing jacks assures built-in safety while dumping.

▶ 30% TO 60% SAVINGS REBUILDING ROADS

Money-making companion for the Athey Force-Feed Loader, the Athey Portable Breaker reduces old aggregate at a rate of up to 200 tons per hour, lets you bid lower, show a good profit.



◀ SPEED AND BIG PAYLOAD FOR LONG HAULS

High speed, 31-ton capacity make the PR20 Rear Dump Trailer a real money-maker. Especially designed for jobs that require big capacity unit on long hauls.

▶ TOP SPEED AND MANEUVERABILITY

As maneuverable as a pickup truck, the Athey PR15 is fast and easy to spot under shovels, in restricted areas "off limits" to conventional haulers.

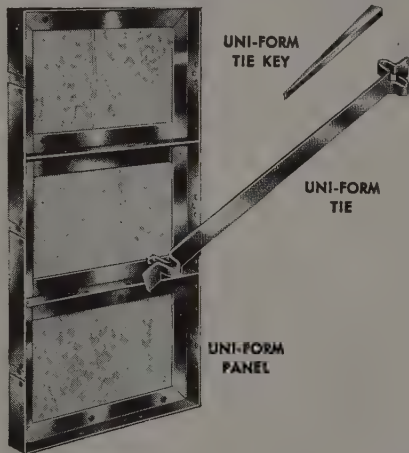


ATHEY PRODUCTS CORPORATION, 5631 West 65th Street, Chicago 38, Illinois

UNI-FORM Concrete Forms

SIMPLE...FAST...FLEXIBLE

3 BASIC ELEMENTS mean
Faster, Easier, More Accurate Forming



Simple mechanical assembly of UNI-FORM Concrete Forms provides faster forming... easier stripping and lowest all around costs. Ready to use when they reach the job, UNI-FORMS guarantee time, material and labor savings on any forming job. Let us prove UNI-FORM advantages... send us a set of prints for free recommendation and proposal on your next job. There's no obligation.

FORM CIRCULAR WALLS AT LOWEST COST

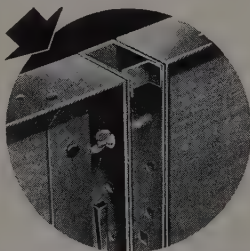
- No alignment or bracing on outside.
- Free working area.
- Minimum excavation required.
- Maximum job safety.



UNI-FORMING Circular walls costs less per square ft. of contact area... provides unhampered steel setting... greater control of concrete placement. Write for details on UNI-FORMING circular walls.

PREFABRICATED CIRCULAR WALL FILLER

Used on outside form only... assures true form curvature with standard UNI-FORM Panels.



RENTED...SOLD...RENTED WITH PURCHASE OPTION
SEE YOUR LOCAL DISTRIBUTOR



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MANUFACTURED BY
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GENERAL OFFICES AND FACTORY: 1238 N. Kostner • Chicago 51, Illinois

catalog and series of bulletins available from Talbert Trailers. The bulletins illustrate the step-by-step process of loading and unloading these trailers which are equipped with the patented Removable Gooseneck. Design details on springs, axle suspension, and other features are described. Specifications are listed and models are illustrated for the entire line ranging from 10 to 100-ton capacity. These bulletins and others may be secured directly from Talbert Trailers, Inc., 7950 West 47th Street, Lyons (Chicago suburb), Ill.

Field engineers and surveyors catalog

A wide selection of equipment and supplies for field engineering including such items as transits, levels, leveling rods, tapes, field books, and accessories are described and illustrated in a 32-page catalog just released by Frederick Post Co. Copies are available on request from Frederick Post Company, 3666 N. Avondale Avenue, Chicago 18, Ill.

All-purpose auger

For drilling holes in frozen earth, rocky soil, shale, and other material up to semi-rock, the "Alaskaug" Auger is described for the first time in a folder just released by Alaskaug, Inc., 620 Keith Building, Cincinnati 2, Ohio. The bulletin describes the principle of the drill, its quarrying action and illustrates some of its uses in the field. It has been used rather extensively by contractors in Alaska to drill into permafrost.

What's new in Teco connectors

A 12-page catalog presents the latest information on Teco connectors for all types of timber construction. Most common of the devices used in this system of timber construction are the wedge-fit split ring connectors and the Trip-L-Grip framing anchors. To assist designers in specifying the proper type of connector the booklet provides sample specifications for each type. Names and addresses of timber roof truss fabricators in all sections of the West are listed as a reference for builders. Copies of the booklet are available from Timber Engineering Co., 1319 Eighteenth Street N. W., Washington 6, D. C.

John Deere tractors

In a 24-page booklet John Deere reviews its crawler and wheel-type tractors and all of the many types of accessory equipment. All of the tractor models are illustrated and detailed specifications are provided. Complete information is provided on the new "420" tractor engine. Letters from



*"I'm burning these ten-spots," said Hodge,
Burning bills in his big truck garage,
"To show how we lose,
When a new truck we choose,
Without first having checked on Dodge!"*

QUICK QUIZ FOR TRUCK BUYERS

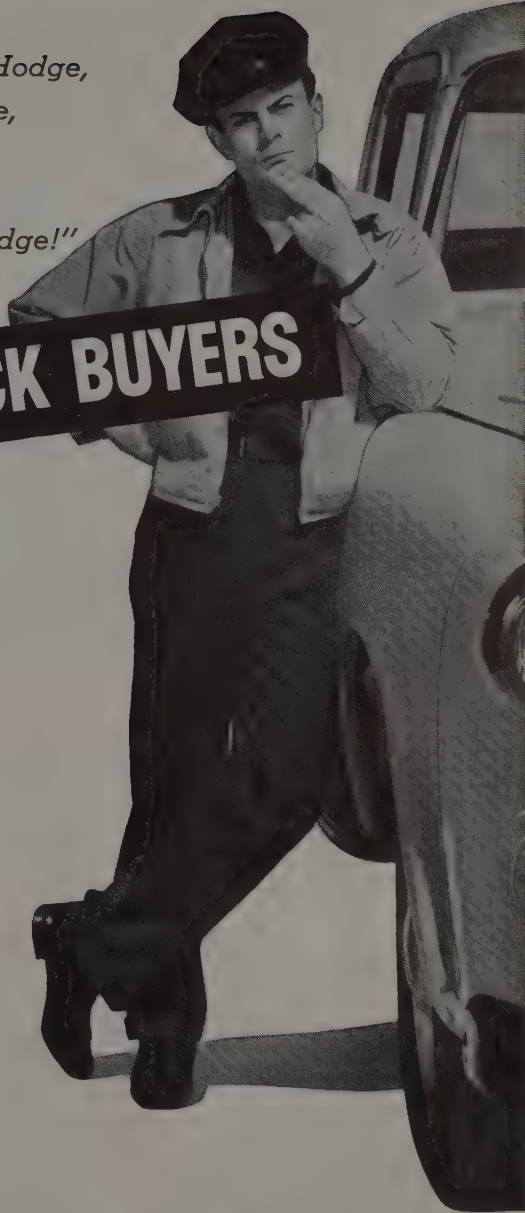
Try this quick quiz before you buy your next truck—and you'll get a better truck for your money:

- Q.** What truck line offers you *today's lowest prices* on such popular models as the ½-ton panel, the 1-ton express, and the 1½- and 2-ton stakes?
- Q.** Which truck line has the largest cabs?
- Q.** Which has the greatest driver visibility?
- Q.** Which has the shortest turning radius?

The answer is "Dodge"—leader for the last 39 years. And this year "Dodge" is the answer to virtually every question you can ask that has to do with lower cost haulage or delivery.

You'll find Dodge trucks are the best answer, too, on price. For Dodge trucks are priced so competitively that no one can beat your Dodge dealer's deal.

When time comes to buy your next truck—get the answers that will lead you straight to today's best truck value—Dodge.

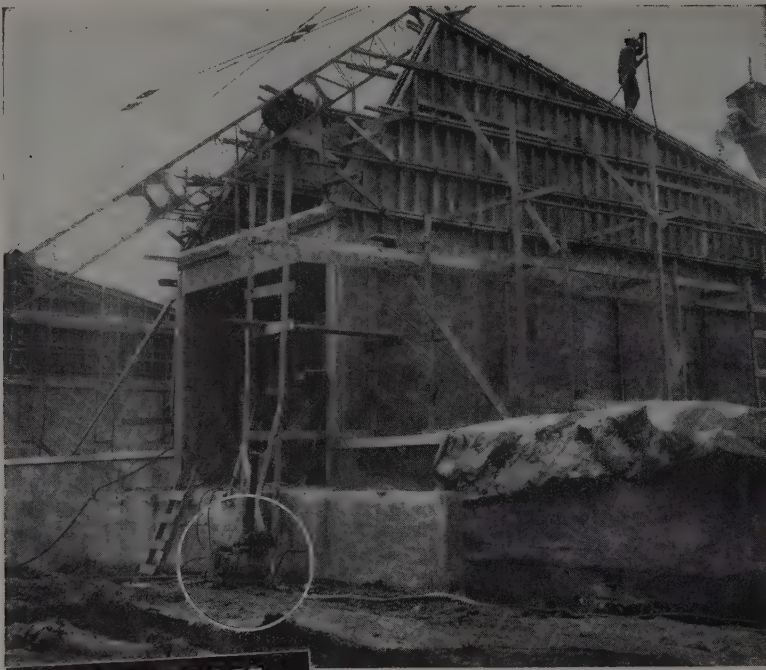


DODGE
Job Rated
TRUCKS

WITH THE FORWARD LOOK



Get the Dodge Dealer's Deal Before You Decide



ALL-PURPOSE

MAGINNISS CONCRETE VIBRATORS

Cut costs on every job!

Whether you're using plastic or stiff mixes, Maginniss Hi-lectric Vibrators will place concrete faster and produce blemish-free finished surfaces.

Powered by a constant-speed 180 cycle 120 volt induction type motor located in the vibrator head for maximum efficiency, Hi-lectrics produce variable frequencies up to 10,500 V P M and maintain constant speed at all times—they do not slow down and lose vibrating effectiveness even under full load in stiffest low-slump concrete! This means you can use all purpose Hi-lectric Vibrators on any job, no matter what the concrete specifications may be.

Because pours are completed faster, labor expense for the entire crew is reduced. One-man operation cuts vibrating costs, too. The Hi-lectric power unit can be located as much as 200 ft. away from the work site—the vibrator operator is free to move about on the forms unhampered by cumbersome, unwieldy flexible shafts. What's more, with blemish-free surfaces, costly hand finishing is eliminated.

Ask your Maginniss distributor to demonstrate on your present job—he'll show you how Hi-lectric equipment can cut your concrete placing costs. You'll find him listed in the Classified Section of your telephone directory.

AA-1826

Simple, rugged construction of Hi-lectric motor-in-head vibrators keeps maintenance costs at a minimum. There are no brushes, commutators or armature windings to burn out.



MAGINNISS
POWER TOOL COMPANY
154 DISTL AVENUE • MANSFIELD, OHIO



users are included as well as many job photographs. Allied equipment includes scarifiers, backhoes, scrapers, generators, concrete breaker, and trencher. The book is available from any branch of the John Deere Plow Co.

Wedges for post tensioning

An 8-page folder reviews the principle of the Stressteel tensioning units as anchorages for prestressed concrete. The booklet not only reviews the principle of the wedge but provides tables of dimensions and specifications including man hours required for placing and tensioning these units. The folder may be secured from Truscon Steel Division of Republic Steel in Youngstown, Ohio. Ask for folder No. 4-E-12.

Armco pipe and accessories

All accessories available to use in connection with Armco drainage and culvert pipe are described and illustrated in a new bulletin. These include accessories to provide square, beveled, and skewed ends and used as drop inlets and spillways. Copies may be secured from Product Information Service, Armco Drainage & Metal Products, Inc., Middletown, Ohio, asking for CMS-12055.

Concrete vibrators, screeds, and trowels

In a new 16-page catalog Stow presents complete information and specifications on its line of gasoline and electric vibrators and other machines for finishing concrete. The catalog also reviews concrete grinders and various accessories and attachments. Four sizes of Roto-Trowels are shown from 24 to 46 in. in diameter. Copy of the catalog may be secured from Stow Manufacturing Co., 56 Shear St., Binghamton, N. Y.

New mixer by Worthington

Designed to take the reader on a trip completely through its Hi-Up truck mixer a 16-page pictorial bulletin has just been issued by Worthington Corp. A series of nine pictures show the accessibility features of the truck mixer and its various parts. Weight and legal payload information is included with information on mechanical features and ease of maintenance. Copies may be secured from Worthington Corp., Sales Promotion Department, Harrison, N. J. Ask for bulletin No. 1260-BIA-P.

More on Lincoln welders

An 8-page folder illustrates and provides specifications for the line of Lincoln Shield-Arc industrial DC welders. The bulletin also provides information on the construction fea-

Trimming back banks, 2½-yard shovel loads Rear-Dumps with 9 to 10 tons of granite and dirt, in an average of three passes. Loading time in this rocky going: about 1 minute 50 seconds.



"Can't be beat" for work in cramped quarters," says supt. on mountain road job

To relocate four miles of dangerous, winding, one-way highway through the Sierra Nevada mountains in western California, Ball & Simpson, Berkeley, moved about 800,000 cubic yards of granite.

This job required sturdy haul equipment that would move rock fast during the summer months before snow closed roads for the winter. To handle this work, company drove in three, sure-footed, 28 mph D Tournapull Rear-Dumps.

Work faster on mountain roads

Tournapulls' 90° turning ability, provided by instant-acting, easy-to-operate power steer, enabled these Rear-Dumps to spot for load and dump faster and more safely than could a conventional dump-truck.

Giant multi-disc four-wheel air brakes, with more brake surface on one wheel than most haulers have on all four, gave operators confidence to use Tournapulls' top speeds on steep, narrow mountain grades.

Says Operator Gordon D. Wood, "These Tournapull Rear-Dumps have good brakes that you can depend on to stop *right now*. Machines are easy to handle, too. They certainly get around good in narrow spots."

Because of Tournapull's advantages, each Rear-Dump was able to average 1000' cycles in 4 minutes 10 seconds.

Superintendent E. E. Frost, said that, in the best production he could recall, each of the three Rear-Dumps hauled 200 loads 300' down a steep grade, during one 10-hour day.

He describes this relocation job on the Sonora Pass Road as one of the toughest examples of rock road work he had ever seen. "Tournapull Rear-Dumps can't be beat. They are a wonderful piece of equipment for this type of work. Tournapulls run in and get under a shovel so much easier than a truck!"

No major repairs in 3 years

During three seasons in the Sierra Nevada mountains, machines have experienced very little downtime, needed no major repairs. Although the three "D's" have been used more than 2500 hours each, original tires are still in good condition.

Why not check on what this power, speed, and production can do on your hauling jobs? Ask your LeTourneau-Westinghouse Distributor for owner-verified production figures on the size Rear-Dump best suited to your job... the 11-ton "D"... the 22-ton "C"... or the big 35-ton "B."



Tournapull dumps in ½ minute, including time maneuvering to edge of bank. "They're fast dumpers" says Operator Gordon D. Wood. Working a 58-hour week, Tournapulls hauled 75% of the material in this road relocation. Balance was moved by 2 crawler-scraper combinations and 2 crawler-dozers.



Rear-Dumps hauled granite-fill for relocation of 4 miles of mountain highway. The new, modern, two-way road, built under the direction of the Bureau of Public Roads, eliminates a narrow winding section of the Sonora Pass Road (State Route 108), between Dardanelle and Strawberry.

Tournapull—Trademark Reg. U.S. Pat. Off. DR-914-H-5

LeTourneau-WESTINGHOUSE Company
Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company



MORE ON-THE-JOB TIME



**when you use hoists
and bodies that are
preferred for the
really tough jobs**

When it comes to a competitive showdown, MARION bodies and hoists lead the way. In performance . . . in economy of operation . . . in dependability and long life, truck owners have found MARIONS will handle the really tough jobs faster and more profitably. Once you've used a MARION, there's little chance you'll be satisfied with any other dump body and hoist. Get all the job-proven facts today from your nearby MARION Distributor . . . or write direct to the factory.

MARION
BODIES AND HOISTS

MARION METAL PRODUCTS CO.
MARION, OHIO

**See Your Marion Distributor.
Let Him Solve
Your Dumping Problem More Profitably!**

M & F Equipment Co.
824 Arno St., N.E.
Albuquerque, New Mexico

Bogard GMC Company
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Tucson, Arizona

Truck Body Company
2865 East 26th Street
Los Angeles 23, California

Ruckstell California Sales Co.
2985 Ford Street
Oakland 1, California

Ruckstell California Sales Co.
410 Broadway
Fresno, California

Woebber Auto Body & Mfg. Co.
4950 Jackson St.
Denver 16, Colorado

Pacific Body Builders, Inc.
1812 N.E. Grand
Portland 12, Oregon

Alloy Manufacturing
Route No. 4
Spokane, Washington

Washington Truckstell Sales, Inc.
3626 Airport Way
Seattle 4, Washington

Erwin H. Johnson, Inc.
Box 1831, 1101 3rd St., N.W.
Great Falls, Montana

tures of these machines and reviews their output rating. Copies of the bulletin titled "Lincoln Shield-Arc Engine-Driven Welders" may be secured from the Lincoln Electric Co., Cleveland 17, Ohio.

LineMaster for highways

A low priced marker to paint lines on highways which features the advantages found in more expensive machines is described in a new 4-page folder just released by the M-B Corp., New Holstein, Wis. The bulletin gives specifications for the marker explaining in detail the features of the unit.

Handy portable steel building

A folder just released by United Steel Fabricators, Inc., Wooster, Ohio, illustrates and describes variations of its standard USF Handy-Hut, a portable all-steel building. The folder illustrates the clip-and-wedge method of erection without screws or bolts and explains how the building can be expanded in 2-ft. units together with illustration of the accessories that are available. The buildings can be mounted on skids for moving around a construction project.

Emergency water line repair

An illustrated 4-page folder describes the features of the new Dresser Hydrepair clamp designed to fix breaks and holes in asbestos cement and cast iron pipe. Normal size of this clamp is in 4-, 6- and 8-in. units. According to the folder the clamp has advantages over any previous method of repair including ease of installation, high strength, good conformity to the pipe. Convenient packaging and only a wrench and pocket knife required for installation are other features. The bulletin may be secured from Dresser Manufacturing Division, Bradford, Pa., or sales offices in Denver and South San Francisco.

New catalog by Thew

To describe two new 25-ton Lorain Moto-Cranes (Models MC-425 and MC-425W) the Thew Shovel Company, Lorain, Ohio, has just released a catalog describing the new features of the units plus action photographs. Among the new developments described are the availability of a revolutionary mounting that eliminates turntable rollers, a boom of greater strength and removable counterweights to reduce overall weight for highway travel. The catalog may be secured from the company.

Spreaders by Miller

A 4-page bulletin describes the Miller spreader for bituminous concrete—hot or cold—limestone gravel or other base material. The bulletin describes the exclusive features of the spreader and the available accessories. It may be secured from Miller Spreader Corp., 4020 Simon Road, Youngstown, Ohio.

LAPIDOLITH HAS CASE-HARDENED FORD MOTOR'S CONCRETE FLOORS FOR OVER 40 YEARS!

Since their original order in 1915, Ford Motor Company has hardened millions of square feet of concrete floors with LAPIDOLITH!

The powerful hardening action of Lapidolith makes concrete floors harder and more dense to prevent their crumbling and dusting under wearing action!

Only one inexpensive treatment is necessary, because liquid Lapidolith penetrates deeply into concrete to harden in *depth* as well as on the *surface*.

LAPIDOLITH—the concrete hardener backed by a bonded guarantee!

When floors are Lapidolized according to specifications, L. Sonneborn Sons, Inc. makes available a Bonded Guarantee (backed by the National Surety Corporation of New York)—assurance that concrete floors are hardened and will not dust or crumble under wearing action!

Architects, Builders, Contractors and Maintenance Engineers are urged to get the facts on Lapidolith. Write today for more information.



**FORD'S NEW CENTRAL STAFF
OFFICE BUILDING, Dearborn, Mich.**

Product of **Sonneborn** RESEARCH

Makers of Hydrocide Colorcoat
Hydrocide S.X Colorless
Hydrocide Dampproofings

MAIL COUPON FOR FURTHER INFORMATION

L. SONNEBORN SONS, INC.
Building Products Division—Dept. WC 4
4821 S. Vermont Ave., Los Angeles 37, Calif.

Gentlemen:

We are interested in more information on the concrete hardening properties of Lapidolith.

Architect ☐ Builder ☐ Contractor ☐ Maintenance ☐ Dealer ☐

Name _____

Company _____

Location _____

City _____

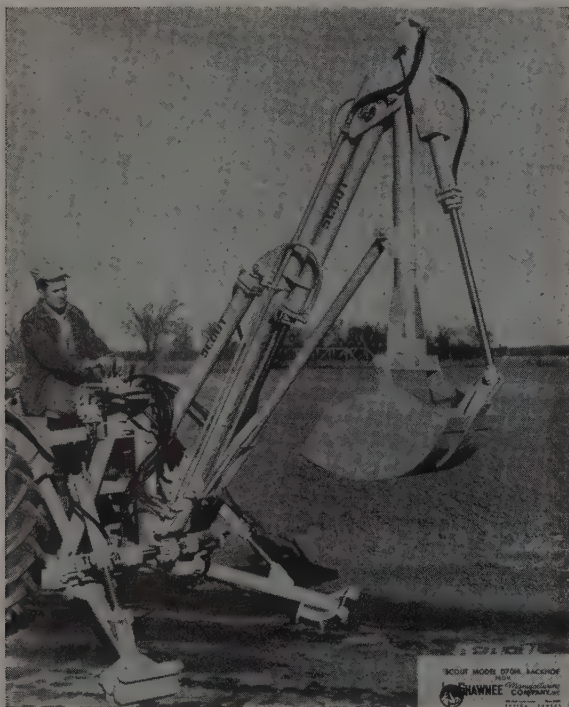
Zone _____ State _____

NEW EQUIPMENT

For your convenience in obtaining more information quickly, the manufacturer's address is provided with each review.

Shawnee backhoe has hydraulic feet

Designated the Scout D-70-HL, the new Shawnee model is basically the same backhoe as the Scout 70, but comes with individually controlled hydraulic stabilizers. The stabilizers serve as "feet" and permit the operator to level up his equipment on slopes or when working



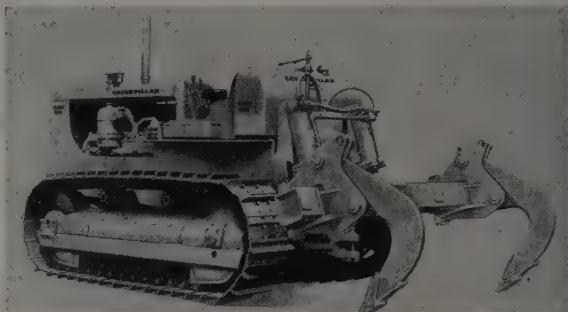
with one side of the tractor on a curbing. This enables the machine to quickly level up for digging plumb holes on slopes. Valves on either side of the main valve bank operate the feet. It is possible to mount the D-70-HL on a number of popular-make tractors. The Scout backhoe digs 12 ft. deep and reaches 14 ft. **Shawnee Mfg. Co., Inc.**, 1947 N. Topeka Avenue, Topeka, Kan.

New line of Hercules engines

Hercules Motors Corp., Canton, Ohio, has begun production of four new series of gasoline and diesel engines. A line of overhead valve gasoline engines known as the G. O. Series is available in three different bore sizes in both 4- and 6-cylinder construction. A line of direct injection diesels, known as the D. D. Series, is also available in three different bore sizes in 4- and 6-cylinder construction to match the G. O. Series. The new G. O. and D. D. series engines of like size not only are interchangeable as units but many parts and components can be used in either design. Thus, an engine built as a gasoline unit can be converted into a diesel without a great deal of trouble.

Tractor-mounted ripper for Cat D8's

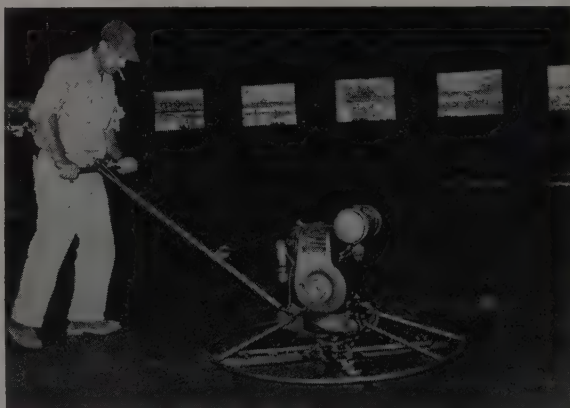
The Caterpillar Tractor Co., Peoria, Ill., has announced a tractor-mounted ripper for use with its D8 tractor. It was designed to facilitate better maneuverability and ease of operation over the tractor-towed type. Down pressure equivalent to the weight of the rear end of the tractor is available at the operator's finger tips. The hydraulic pump is mounted on and driven by the engine rear power take-off so that the ripper can be raised or lowered whenever the engine is running, inde-



pendent of the flywheel clutch. The control valve is enclosed in the tank and provides the operator with raise, lower, hold, and float positions. The teeth points are replaceable.

New Stow 46-in. Roto-Trowel

Stow Manufacturing Co., 56 Shear Street, Binghamton N. Y., has put on the market a large size rotary trowel that is easy to handle and is well suited to large floor areas since it trowels 11 sq. ft. of surface per revolution. Called the G46 the machine has 4 blades which



means a flatter floor—important when specifications call for a concrete floor smooth enough so that floor surfacing material can be laid directly over the concrete. The G46 has stationary guard ring which protects the blade and supporting arms from damage. A manually actuated



Cleveland "Baby Digger" averages 3,500' of 22" x 36" water line trench daily, digging in clay and rock

R. L. Eatherly of Carthage, Tenn. got good daily trench production with his Model 95 Cleveland "Baby Digger" on this water line contract in the Belshire Subdivision in Nashville. Averaging 3,500 feet per day, the Cleveland cut 4 miles of trench, 22 inches wide by 36 inches deep in curving roadways on a subsoil composed of clay with fairly heavy rock content. The Cleveland's completely unobstructed operator visibility and the convenient grouping and location of its controls for easy accurate digging were definite advantages in cutting the curved trench. Just another example of the outstanding ability of Cleveland Trenchers to *dig more trench . . . in more places . . . at less cost.*

Talk it over with your Cleveland distributor



THE CLEVELAND TRENCHER COMPANY • 20100 St. Clair Ave. Cleveland 17, Ohio



CLEVELAND

clutch controlled from the handle stops the machine from rotating the second the operator lets go of the handle. The engine can be started up at full throttle. The pitch of the float and finish blades can be varied to any degree while the machine is running by adjusting the knob on the handle. A hook is provided on top of the engine for lifting up to upper stories.

Horizontal shoring has built-in camber

A simplified horizontal shoring with built-in camber for use as a support for form work in reinforced concrete structures is now available from **Universal Builders Supply Co., Inc.**, 51 E. 42nd Street, New York 17, N. Y.



By eliminating intermediate vertical shores, freeing the space on the floor below the forms, and insuring safety during pouring of concrete, the new shores can

reduce form work by 40% or more. By adjusting only one screw before placement, the camber is automatically set and the supports can then be extended to any desired length of span. S-L Spanall sections may be assembled at the site simply by telescoping one or more web-plate sections into one or more lattice sections. These have been engineered to fulfill all structural horizontal shoring requirements for spans up to 29 ft. 6 in. without the need of intermediate shoring.

International improves Payscraper line

The new Payscraper models are now in production at **International Harvester Co.**, 180 N. Michigan Ave., Chicago 1, Ill., the 262-hp. "75" and the 172-hp. "55." The model 75 capacity has been increased to 20 cu. yd. heaped and the model 55 to 14 cu. yd. heaped. Other



changes in the units are straight-back bowl, lower draft frame, greater visibility, new clutch facing on the "75," higher apron lift, bigger push block, and improved ejector. The machines have been completely field tested. Complete specifications are available on request.

New TELESCOPING VIBRATORY SCREED



BUILT ESPECIALLY for

- Overpass and Bridge Roadways
- Tilt-Up Slabs and Industrial Floors

The Cmetco Telescoping Vibratory Screed is a radically new piece of cement finishing equipment. It has been engineered to economically solve many of the problems confronting the larger contractors. Costs per cubic yard per man-hour are appreciably reduced. Cost for screeding equipment is less. Better depth compaction is another valuable feature.

Due to its fast telescoping feature it avoids the cost of auxiliary beams. Because it has no beam overhang it can be operated close to existing walls. Forms are protected because the telescoping feature adjusts shoe-plate length to form widths; to fractions of inches if necessary.

BETTER EQUIPMENT FOR PLACING AND FINISHING CONCRETE
 POWER BUGGIES • TELESCOPING VIBRATORY SCREEDS • ECONOMY VIBRATORY SCREEDS •
 ROLA PAVERS AND TRENCH BOXES • WOOD AND STEEL TILT-UP HARDWARE • BULL FLOATS
 • HOPPERS • BUCKETS • ELEPHANT TRUNKS AND CHUTES • TAMPERS • HAND CARTS

ITS SHOE-PLATE **NEVER** RIDES THE FORMS



Pots. Applied For

3,600 to 10,200
Vibrations per Min.

- UNSURPASSED FOR DEPTH COMPACTION
 - RE-TRANSMITTED VIBRATION AVOIDS DEAD SPOTS
 - CONTROLS ITS OWN PILE-UP
 - HANDLES MORE CUBIC YARDS PER MAN-HOUR
 - QUICKLY ADJUSTABLE LENGTH AND HEIGHT
- WRITE FOR CATALOGS

LENGTH ADJUSTMENT

- MODEL 302
From 15'-6" to 36'-0"
- MODEL 304
From 10'-2" to 25'-0"

HEIGHT ADJUSTMENT

From 1/2" below to
1 1/4" above top of forms

EASTERN REPRESENTATIVE

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LIMA Type 24 Pullshovel with 17' 6" boom, 6' 0" bucket arm and 1/2 cu. yd. bucket.

LIMA Type 24 Jobmaster best all-purpose performer in its class

ere's a rugged, 1/2 yd. all-purpose machine with big machine features. Lima's modern, versatile Type 24 *Jobmaster*, quality-built specialist in its class, has been designed to every one of your job needs.

he *Jobmaster* is available with gasoline, diesel or electric power. It can be equipped as a shovel, 13 ton crane, clamshell, dragline or 1/2 cu. yd. pullshovel with crawler, wagon or truck mountings. The front end equipment can be interchanged easily in the field.

ma quality guarantees high output, low operating and maintenance costs with the *Jobmaster*. Why not boost your operating profits by putting it to work today. For complete details contact your nearby Lima distributor, or write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

COMPARE QUALITY! No other machine gives you as much as a LIMA! These quality extras are yours with the Type 24:

1. All gears have machine cut teeth.

DISTRIBUTORS: Our Seattle Office, 1932 First Avenue South, Seattle 4, Washington; Feenaughty Machinery Co., 112 S.E. Belmont Street, Portland 14, Oregon; Feenaughty Machinery Co., 600 Front Street, Boise, Idaho; Smith Booth Usher Company, 2001 Santa Fe Avenue, Los Angeles 54, California; Modern Machinery Co., 4975 Third Avenue South, Seattle 4, Washington; Modern Machinery Co., 4412 Trent Avenue, Spokane 2, Washington; ALASKAN DISTRIBUTOR, Western Tractor & Equipment Co., 45 Lucille Street, Seattle, Washington; Shriver Machinery Company, P. O. Box 1270, Phoenix, Arizona; Heiner Equipment & Supply Co., 501 West Seventh South, Salt Lake City, Utah; N. C. Ribble Co., 1304 North Fourth Street, Albuquerque, New Mexico; Bay Cities Equipment, Inc., 2606 Cypress Street, Oakland 7, California; City Cities Equipment, Inc., 1178 West San Carlos Street, San Jose, California; Acme Iron Works, Culebra Avenue at Expressway N.W., San Antonio, Texas; Cascade Industrial Supply, Highway 99 South, Redding, California; Faris-Moritz Equipment Company, 1095 South Jason Street, Denver, Colorado; McGaraghan Supply Company, 29 Broadway, Eureka, California; Hall-Perry Machinery Company, 902 Central Avenue, Billings, Montana; Hall-Perry Machinery Company, 812 East Iron Street, Butte, Montana; Hall-Perry Machinery Company, 1116 Fifteenth Street North, Great Falls, Montana.

2. Heat treated ground shafting.
3. 55 anti-friction bearings.
4. Air for main and auxiliary controls.
5. Independent propel, third drum and power load lowering (optional).
6. Independent combination chain and cable crowd and retract.
7. Differential steering (similar to tractor).
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9. Internal-external tooth jaw clutch for quick engagement and minimum backlash in gear train.
10. Inside dipper handle—square cross section.
11. All-welded steel construction.
12. Independent boom hoist with engine controlled boom lowering.
13. Floating steel disc type dirt seals in tread rollers.



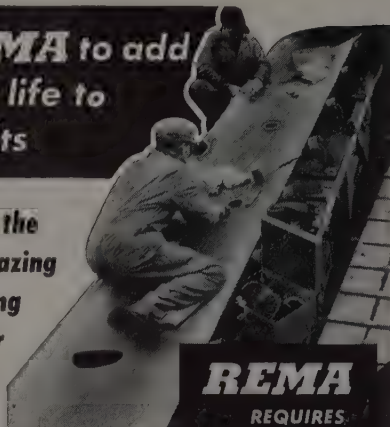
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years of life to
your Belts

REMA is the
New and Amazing
Self-Vulcanizing
Rubber Repair
Material



REMA
REQUIRES

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- NO HEAVY EQUIPMENT
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▼ REMA is not just another cold patch. REMA is vulcanization by chemical process. No heat or heavy vulcanizing equipment required. Here's the astonishing advantage — when repair work is completed belts may be returned to service immediately.

▼ REMA seals out moisture, reduces mildew, rot and deterioration — the great enemies of conveyor belts. Your own maintenance man can quickly repair your belts.

▼ Available in introductory kits or parts separately. Order from your Flexco-Alligator distributor. Write for Folder No. R4

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RUBBER REPAIR MATERIALS

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NEW DEPARTURE BALL BEARING
TROUGHING IDLERS



CONVEYCO
TIMKEN ROLLER BEARING
TROUGHING IDLERS



Patent No. 2,687,799

THERE'S A SECRET TO LONGER IDLER LIFE!
It's U.S. Patent No. 2,687,799

Whatever your job conditions may be, Conveyco Idlers with sealed-for-life New Departure Bearings or Conveyco Timken Bearing Idlers will give you better performance over a longer period. The secret is in the patented construction... let a Conveyco engineer show you how to reduce Idler maintenance.

Note: Conveyco is a convenient source for repair or replacement parts on conveying equipment. Bearings, pulleys, etc.



Call LOgan 5-8411 or write for Catalog 6B Today!

THE CONVEYOR CO.

3260 E. Slauson Ave., Los Angeles 58, Calif.

Barber-Greene adds to "BatchOmatic" series

Barber-Greene Co., 400 N. Highland Ave., Aurora, Ill., has announced that their "BatchOmatic" line of automatic, bituminous batch plants, will now encompass 2,000- 4,000- and 6,000-lb. models. Their units employ the same features of simultaneous weighing of all sizes of aggregate, instant change from fully automatic to manual



operation, and instant positive inspection of aggregate gradation and weight. A complete range of sizes of dryers, dust collectors, elevators, and aggregate cold feed systems for the plants are available. Specifications and literature including a booklet on operating principles are available.

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SELF-PRIMING CENTRIFUGAL PUMPS

*33,000 gallons of water pumped with 1 gallon of gasoline

trouble-free
simplified impeller adjustment — self-lubricating super seal

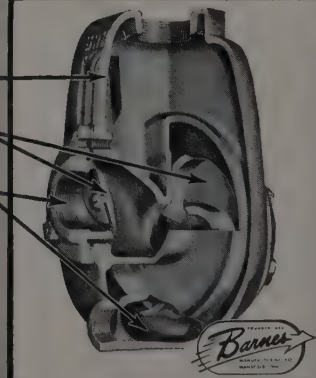
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heavy, thick wall sections

dependable
non-clogging, trash-type impeller — automatically operated suction valve

economical
direct flow suction — exclusive self-priming principle

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Gasoline, Diesel,
Electric or Pulley Drives
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"Forward action" in 56
BARNES MANUFACTURING CO.
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WIRE 1105 ROPE

1105 takes Royal Blue out of the ordinary wire rope class.

1105 is a rope wire that's new — that's stronger. It's the biggest news in many years.

1105 is the result of more than a century of research and development—it's the wire that gives Roebling Royal Blue the stamina that pays off in service.

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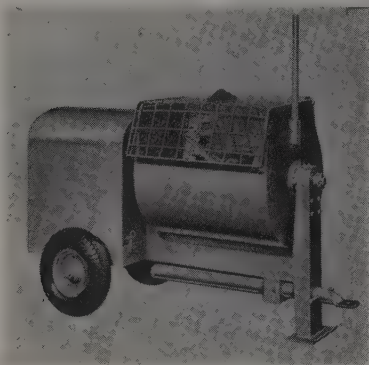
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Tilting-type mortar mixer

A new line of small tilting-type concrete-plaster-mortar mixers is being offered by **Speed King Manufacturing Co.**, a Division of the Jaeger Machine Co., 550 West Spring Street, Columbus 16, Ohio. The 4-cu.



ft. plaster mortar mixer illustrated, and also a larger 6-cu. ft. model, feature pugmill-type mixing by four sets of 3-blade paddles securely clamped to a square shaft. The 4-ft. model has a loading height of 34 in. and a width of 29½ in. Rubber wiper blades are optional. Catalogs and prices are available.

Concrete compression tester

Compression tests of either concrete blocks or cylinders can be made

right on location with a portable testing machine now on the market. Weighing 285 lb., the machine has a capacity of 2,000 lb. The applied load is indicated on a hydraulic gage on top of the unit. Previously two separate units were required to test both blocks and cylinders. Information is available upon request to **Tinius Olsen Testing Machine Co.**, 5152 Easton Road, Willow Grove, Pa.

Improvement on Cleveland backfiller

The Model 80 backfiller has replaced the Model 80W, according to **Cleveland Trencher Co.**, 20100 St. Clair Avenue, Cleveland 17, Ohio. Although the Model 80W weighs 11,500 lb., 1,500 lb. more than the original machine, its ground bearing pressure has been reduced from 7.2 to 4.5 psi. The side crane capacity has been increased to 25,000 foot pounds. Further information is available on these changes plus information on improvements on the Model 190 backfiller and the Model 320 trencher.

Protective resin

Now available is a pitch base bituminous resin of liquid consistency for protecting macadam, concrete, asphalt, or blacktop surfaces. Used on bitumen and concrete roofs, it forms a protective film which

resists atmospheric acids, smoke, fumes, and water penetration. On driveways it protects against gasoline and oil drippings. It also resists salt spray, alkalis, and excessive water. It can be applied over damp surfaces and comes complete, ready to use. It may be brushed on or sprayed. For full information write to **Stonhard Co.**, 1306 Spring Garden Street, Philadelphia 23, Pa.

Painting for sewage plants

The writing of specifications for painting in and around sewage and water works plants is made easy by an "Engineers' Painting Guide" just released by **Inertol Co.** Sample specifications are provided in handy form and an index directs the specification writer from specific units in the plant to products recommended for painting them. Copies of the 28-page booklet may be secured by writing on company letterhead, giving your title, to **Inertol Co., Inc.**, 27 So. Park, San Francisco 7, Calif.

High-speed vibrating screen

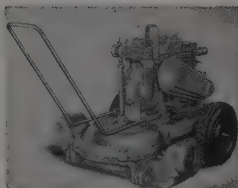
A high-speed vibrating screen has been developed by **Hewitt-Robins, Incorporated**, Stamford, Conn., for the fine screening of sand, clay, chemicals, detergents, and instant coffee. The screen has a speed of 3,300 rpm. when set for a 1/32-in. stroke and 2,400 rpm. when operating on a 1/16-in. stroke.



CMC TRANSCRETES mix and handle any slump concrete better and faster, on any kind of job. Write for new **TRANSCRETE BULLETIN**.



CMC's large variety of types and sizes of pumps—assure lower cost water handling on any construction job! At left, 10" Dual Primer; at right, SKWEE-GEE diaphragm.



For greater performance . . . lower costs . . . day in and day out . . . it's

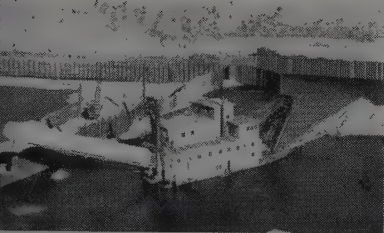


Dollar for dollar—feature for feature—CMC construction equipment is your **BEST** buy! It's backed by close to half a century of manufacturing experience and know how. If you're looking for **BIGGER PROFITS**—then you're looking for **CMC! CONSTRUCTION MACHINERY COMPANY**, Waterloo, Iowa.

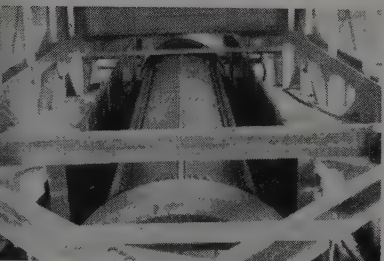
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4 sizes—3½ to 7-yard capacities
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from 3½ to 845
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from 3½ to 12 cubic feet
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- ✓ **HOISTS**—Many models. Single, double drums to 45 H.P.

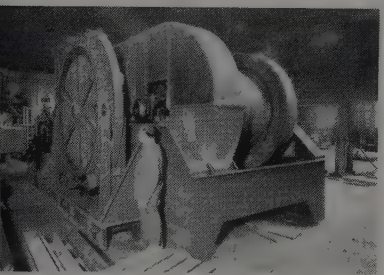
YUBA



BUCKET LADDER AND HYDRAULIC DREDGES for dredging placer properties, harbor and levee construction, channel changes, production of sand and gravel. Hydraulic dredges from 6-inches up; bucket sizes: 2½ to 18 cu. ft., or larger. Digging depths below water as required.



ABRASION RESISTING STEEL SCREENS—flat or revolving for separating, scrubbing, sizing. Holes taper drilled to prevent clogging. All thicknesses from 3/16" up; other dimensions as needed. Abrasion resisting steel plates available from stock.



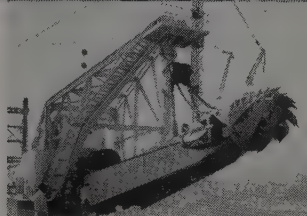
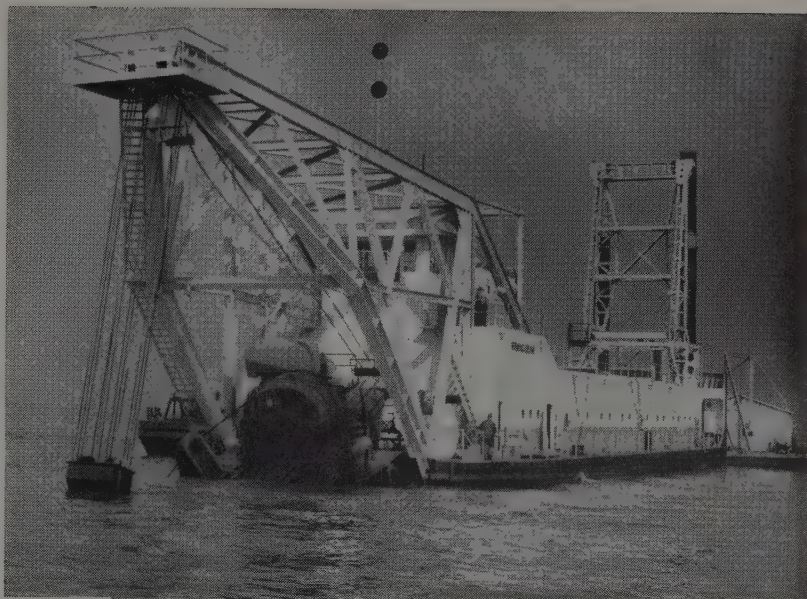
DOUBLE-DRUM HOIST, 1,000-ton capacity, built to handle 194-foot digging ladder, typifies heavy equipment Yuba can build for you.

For estimates, send us your drawings or specifications. No obligation.



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YUBA MANUFACTURING CO.
Room 653 • 351 California St. • San Francisco 4, Calif.



Dredge Franciscan is 207' long, digs 50' deep, with ladder at 45°, pivots in 350' arc on one of two 80' spuds, has seagoing stern. Present power comes from shore, but design provides for installation of on-board power plant.

The cutter head on the Franciscan has a 1,500 hp. motor.

DESIGNED AND BUILT BY YUBA Hydraulic dredge for 11 million yard sand fill

Dredge Franciscan (Yuba No. 170), built for The Utah Construction Co., is the largest, most powerful suction dredge on the West Coast. It has 9 ft. diameter cutter head powered by 1,500 hp. motor, pump has 36" intake and 30" discharge with 8,000 hp. motor. Its immediate job: Filling 390 acres of Alameda (Calif.) tideflats with 11,000,000 cu. yds. of sand for future homesites. Following this job, Dredge Franciscan will fill 24,000,000 yards on adjacent tidelands at Bay Farm Island.

1,500-horsepowered cutter on the dredge successfully tears apart "Alameda sandstone," a very tight formation heretofore handled inefficiently by other hydraulic dredges. Its big pump thrusts sand and silt nearly two miles at a rate that will easily complete the 11,000,000-yard fill in the scheduled year. The entire dredge is operated by one man from a central control room.

If you have hydraulic fill, channels or harbors to excavate, or levee construction, consult Yuba. To your problem, Yuba applies 50 years of building bucket ladder and hydraulic dredges, plus more than 30 years of experience by George Pelton, Yuba consultant on hydraulic dredges. Wire, write or call us NOW—no obligation, of course.

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Tool bar for D7 tractors

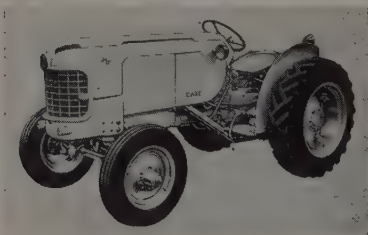
Designed to match the Caterpillar D7 Diesel Tractor, a tool bar 6 in. x 7½ in. x 10 ft. 4 in. is being manufactured by Fleco Corp., Jacksonville, Fla. It includes draft arms,



tool bar, and A-frame assembly for use with rear-mounted cable control units. The tool bar can be mounted on the tractor without interfering with front mounted equipment. Available from Caterpillar dealers.

New Case 300

Now in production is a new Case 300, an industrial tractor which provides a smooth span of overlapping speeds starting as low as ¾ mph. at half-throttle to 20 mph. Transport



speeds up to 20 mph. save valuable time in driving from one job site to another. The high compression and high torque with consequent high lugging ability of the 4-cylinder gas engine reduce fuel consumption and gear shifting. All controls are in easy reach of the operator. Regular equipment includes an hydraulic sys-

tem with constant running pump. It provides selective or simultaneous operation of two control rams, either single or double acting. For further details write to the J. I. Case Co., Racine, Wis.

Small generator by Homelite

Small size, lightweight, close voltage regulation are among the features in the 1,500-watt generator announced by Homelite, Port Chester, New York. The unit is 115-volt, 60-cycle AC generator which will operate all types of portable electric tools and provide standby power in emergencies. It weighs 90 lb. A control is included which automatically switches the engine to idle when no current is drawn and immediately brings the engine to full speed when load is applied.

Rocket transport mixer

The Rocket is Concrete Transport Mixer Co.'s new 6½ to 7-yd. truck mixer. Standard equipment includes hydraulically operated chute control, aluminum detachable extension chute, and an electric revolution counter kit. A choice of industrial engines is available. The Rocket also is available in 3-, 3½-, 4½-, and 5½-yd. models. Concrete Transport Mixer Company, 4985 Fyler Avenue, St. Louis 9, Mo.

Wedge type timber connector

In order to obtain tighter joints in wood trusses, the wedge principle has been incorporated in the Teco wedge-fit, split-ring timber connectors, developed by Timber Engineering Co., research affiliate of the National Lumber Manufacturers Association. Because of the wedge shape there is less than 1/32-in. clearance between the ring and the groove, producing tighter joints that minimize truss deflection. Timber

Engineering Co., 1319 18th Street N. W., Washington 6, D. C.

Stow markets 3 grinding blocks

Stow Manufacturing Co. has marketed a set of three grinding blocks that can be attached to the G 34 Roto-Trowel. The blocks are 2x3x½ in. long and can be attached in place of the trowel blades with a wing nut. The G 34 has a 2½-hp. engine which will drive the blocks at speeds as low as 25 rpm. The blocks are used to rub down the seam be-



tween slabs or to obtain fine finish on any flat surface. They can be used both for dry grinding or at slower speeds for wet rubbing. For further information write the manufacturer at 56 Shear Street, Binghamton, N. Y.

A new line of electric motors

"The New L. A. Line of Electric Motors" is the title of an informative bulletin just published by Louis Allis Co. of Milwaukee, Wis. The brochure provides photographs and information on all of the new electric motors with complete descriptions of features and characteristics. Graphs and tables provide essential performance information. The booklet may be obtained from The Louis Allis Co., Milwaukee 7, Wis., by asking for Bulletin No. 1700.

Emergency lighting unit

An explosion proof lighting unit that provides emergency illumination automatically whenever the regular source of power fails has been announced by Electric Corp.

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Capital Scaffolding & Equipment Co.
North Sacramento, Calif.

Borchers Brothers
342 North Second St., San Jose, Calif.

The United Materials
814 West 14th St., Denver, Colo.



Another new clear-span transit shed takes shape on Pier 1 as Bethlehem Pacific crews speed the erection of structural steel. Support for the new building is provided by Bethlehem H-piling. Pre-cast concrete walls are reinforced by Bethlehem Pacific bars. General Contractor: J. C. Boespflug Construction Co. Designer: George F. Nicholson, Engineer.



This is Pier "A," the world's longest. First to design and construct gigantic clear-span transit sheds, the port management also developed the use of 62-ft diameter circular steel cells formed with Bethlehem Sheet Piling to retain hundreds of acres of filled areas and to support its steel and concrete wharves.

More Cargo Space for Man-Made Port of Long Beach

The Port of Long Beach has been growing at a rate that is nothing short of phenomenal. Serving the expanding Southern California areas, the flow of cargo has increased from 358,000 tons in 1925 to an estimated 8½ million tons

in 1955. And it is still growing.

In addition to fabricating and erecting structural steel for transit sheds at this port, Bethlehem Pacific has supplied thousands of tons of sheet and H-piling, reinforcing steel, tie-rods, and bolt

and nut specialties. We also supply many other forms of steel: wire rope, nails, pipe, wire, open-web joists, sheets—in brief, just about any kind of construction steel. Call our nearest sales office for full details.

BETHLEHEM PACIFIC COAST STEEL CORPORATION
Sales Offices: Los Angeles, Phoenix, San Francisco, Portland, Seattle, Spokane

BETHLEHEM PACIFIC



Co., 195 William Street, New York 38, New York. All electrical components are housed in approved Crouse Hinds explosion proof equipment. The operation of the unit is completely automatic and it contains no manually operated controls or timers. It can support a total of five heads. With two heads it will furnish approximately $7\frac{1}{2}$ hr. of continuous emergency light.

Blue Brute compressor line complete

With the addition of a new 210-cfm. portable rotary compressor, Worthington Corporation's Portable Compressor and Contactors' Tool Division, Harrison, N. J., has announced the availability of a complete new line of Blue Brute compressors which include the 125-, 210-, 315-, and 600-cfm. sizes. The new unit features the same advancements as the others in the line, for example, a newly-designed clutch, a separate oil reservoir equipped with a pre-heater, combined to assure immediate cold weather starting. General maintenance and inspection of parts have been simplified by easy accessibility features, and a gravity-draining design of the cylinders prevents lock and the danger of oil accumulation. All types of standard mountings are available in all the sizes.



Huber-Warco announces two new graders

Two new motor graders featuring a torque converter and full power shift transmission—the 140-hp. 7-D and 100-hp. 6-D—have been announced by the Huber Warco Co. of Marion, Ohio. Standard on both grader models is a power sliding

moldboard, operated hydraulically from the cab. The operator can attain a high bank sloping angle up to 90 deg. on either side without leaving the cab, and the blade can be rotated 180 deg. without removing the scarifier teeth. Both machines have a hydraulic booster steering system.

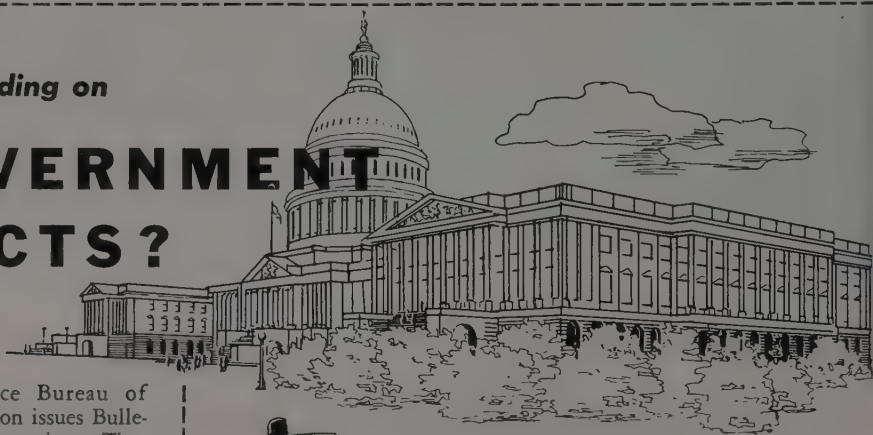
The Universal Golden Wobbler 24

The Universal Wobbler Feeder which has been used in the mining industry since 1950 has made its first appearance as a portable crushing plant. The Golden Wobbler Feeder performs the dual function of feeding and screening in one operation.

Self-cleaning Wobbler bars guarantee separation of fines from oversize in the wettest or stickiest of materials. The crushing plant is described in a specification sheet and illustrated brochure available from the manufacturer, Universal Engineering Corp., 625 C Ave., N. W., Cedar Rapids, Ia.

Interested in bidding on

GOVERNMENT PROJECTS?



The Washington Service Bureau of National Surety Corporation issues Bulletins on U.S. Government projects. They tell who is issuing the invitations, where bids are being received and when they are being opened. To receive these bulletins, without obligation, write to either of the Central Bonding Offices listed below or to any of our Branch or Service Offices.



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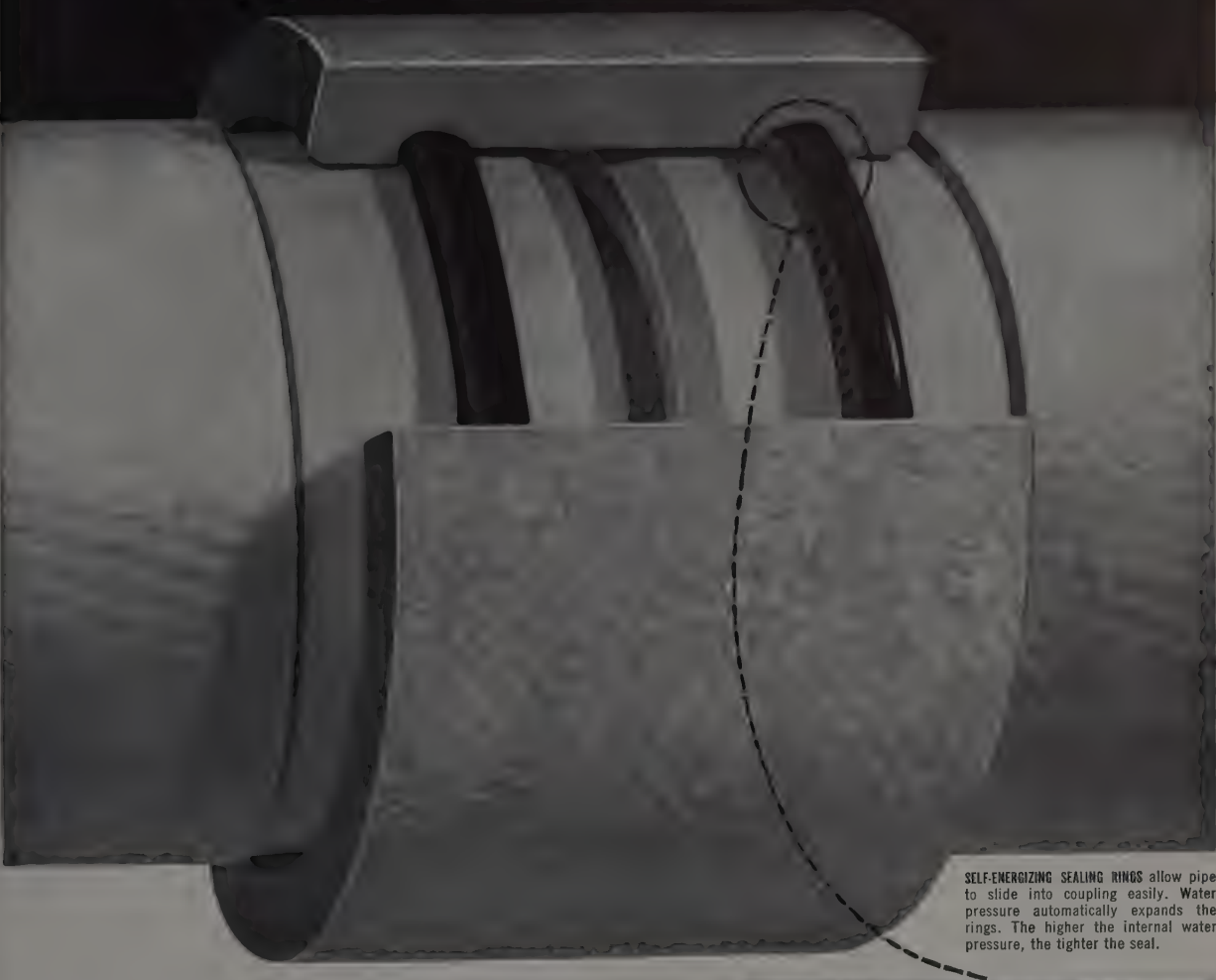
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"FLUID-TITE" COUPLING*

For "Century"® Asbestos-Cement Pressure Pipe



SELF-ENERGIZING SEALING RINGS allow pipe to slide into coupling easily. Water pressure automatically expands the rings. The higher the internal water pressure, the tighter the seal.

- Cuts installation time
- Provides permanent, water-tight seal

Now, using the new "Fluid-Tite" Coupling, crews can lay more "Century" Asbestos-Cement Pressure Pipe per hour than ever before. No cumbersome coupling pullers are needed. "Century" Pipe can be easily connected with standard valves, hydrants and fittings.

Thanks to the speed and simplicity of using "Fluid-Tite" Couplings, there is no need to hold up pipe-laying operations in rain, snow or wet trench conditions. Specify "Fluid-Tite" Couplings with "Century" Asbestos-Cement Pressure Pipe. You'll get more rapid installation, plus full flow and low maintenance. Write today for details.

"Century" Pipe and "Fluid-Tite" Couplings meet A.W.W.A., A.S.T.M., and Federal specifications and are approved by Underwriters' Laboratories, Inc.



From left to right: "Fluid-Tite" Coupling. When main is filled, rings expand sealing rings have tapered surfaces, with application of internal water and compress, to permit pipe to pressure, creating a tighter seal. slide in easily.

KEASBEY & MATTISON
COMPANY • AMBLER • PENNSYLVANIA



*PATENT APPLIED FOR

Telescoping vibratory screed

A new piece of vibratory screed equipment is now available, chief feature of which is a telescoping beam. By loosening several bolts, the shoe-plate and rigid main frame can be telescoped to give any desired shoe-plate contact from 22 ft. 6 in. to 36 ft., or from 15 ft. 16 in. to 23 ft. Shock mountings at the end-trucks



and engine mount protect both engine and the forms from the 10,200 vibrations per minute developed by a 3.6-hp. engine. Descriptive literature is available from **W. J. Burke & Co.**, 2690 Harrison St., San Francisco 10, Calif.

Scaffold winch

A scaffold winch is now on the market which incorporates an escapement pawl that permits the operator to raise the winch as fast as desired but limits lowering speed. The winch streamlines the old rope-and-fall type of swing staging. Sliding cable roller-guides turn on zinc plated shafts of the double sheave feed, spooling cable evenly on and off the drum. The weight is about 10 lb. without bail and cable. For full information write **Sasgen Derrick Co.**, 3123 Grand Avenue, Dept. WNS, Chicago 22, Ill.

Grader blade for IH 300

A center-mounted industrial grader blade for the International Harvester 300 Utility Tractor and other industrial tractors has been introduced by **J. R. Prewitt & Sons Mfg. Co.**, Pleasant Hill, Mo. The blades center mounting utilizes the full weight of the tractor in



maintaining a smooth operation. Rear wheels of the tractor follow the blade's path. Stabilizing arms on either end of the blade give greater control, and double action hydraulic cylinders provide a constant pressurized grading force.

Compacts soil around forms

The Universal Formpacker designed and manufactured by **Western Form & Iron Co.**, Minneapolis, Minn., compacts soil under both sides of a form at the same time at the rate of approximately 25 ft. per min., and insures perfect align-



ment to withstand heavy weights of sub-grading and finishing equipment. The Formpacker is completely adjustable and can be set in a few minutes to fit all standard paving forms from 8x8 in. to 12x12 in. The Formpacker weighs 330 lb. and is guided by a handlebar which can be adjusted to height. The tamping mechanism operates from a counter shaft driven by a traction shaft connected to a Kohler engine. For further information about the Formpacker write to the Kohler Co., Kohler, Wis.

Moisture-vapor barrier film

Gering Products, Inc., Kenilworth, N. J., has announced a new extruded polyethylene moisture-vapor barrier film, called Ger-Pak, for the construction field. It is available in widths up to 20 ft. and wound on rolls of 100 linear feet or more in thicknesses of .002 in., .004 in., and .006 in. It is used as a moisture-vapor barrier under concrete slabs, and crawl spaces around the exterior of foundation walls, and over sub-flooring and on the warm side of a wall as a dust barrier. It will not become brittle with age, crack, chip, or peel, and is highly resistant to most known chemicals

Bucket type earth drill

A model 200-A bucket-type earth drill has been announced by **Calweld, Inc.**, 7222 E. Slauson Ave., Los Angeles, Calif. Larger than previous models, the drill will bore 16- to 84-in. holes to a depth of 200 ft. On each pass it removes 37.5 cu. ft. of earth. Drilling, hoisting, and dumping are performed mechanically and all controls are centrally located in a single unit for efficient one-man control. With an unusually wide variety of interchangeable bucket-drill accessories, boring in every type soil is possible. The model 200-A is built on a skid frame so that it can be mounted on a truck chassis or trailer.

Welder for odd-shaped parts

A portable welding machine designed specifically for manganese steel and hardfacing work on irregularly-shaped parts has been made available after field testing in construction by **Amsco Division of American Brake Shoe Co.**, 389 E. 14th St., Chicago Heights, Ill. The MF welder is designed to plug into conventional a-c or d-c welding units by a single cable. It operates on a current range of from 150 to 450 amps. Features of the welder include a self-feeding mechanism for keeping the welder arc constantly supplied with welding wire, and a conical hopper mounted directly above the welding wire outlet as a means of storing and feeding flux.

Underbody scarifier

A new accessory for use with Seaman Trav-L-Plants and Pulv-Mixers has been announced by **Seaman-Andwell Corporation**, 285 N. 25th St., Milwaukee, Wis. The accessory is an inexpensive underbody scarifier attachment, with 6 teeth and



header board or curb shoe, for light scarification in combination with in-place mixing. Easily bolted between front and rear wheels it is hydraulically controlled from the operator's station. Further details are available.

Air compressor by Jaeger

Now available is the Jaeger Air Plus unit which delivers 365 cfm. of air instead of the conventional 315 cfm. This larger capacity is useful for gunite work and heavy duty sand blasting, or for operating a heavy duty wagon drill and a hand-held



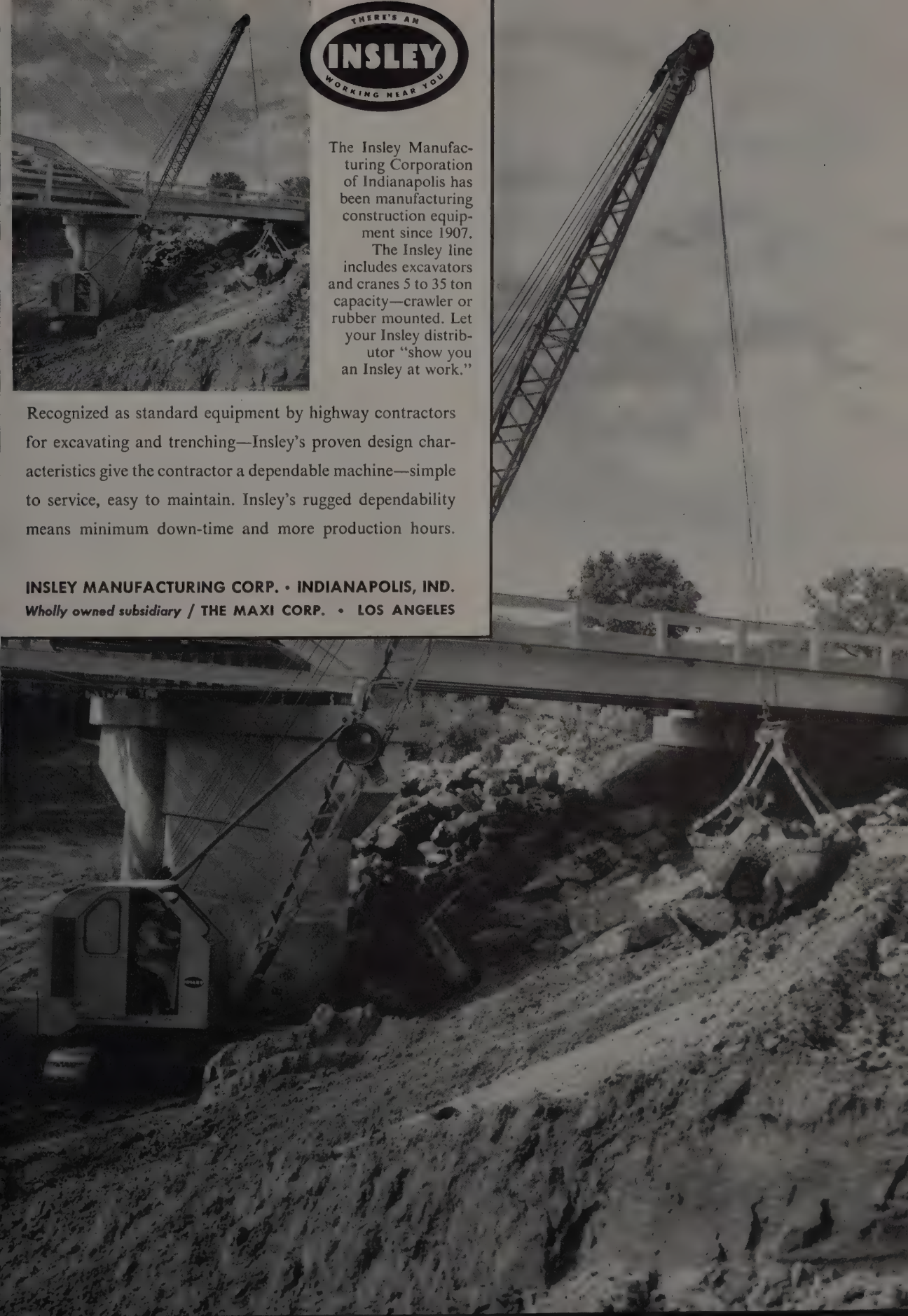
The Insley Manufacturing Corporation of Indianapolis has been manufacturing construction equipment since 1907.

The Insley line includes excavators and cranes 5 to 35 ton capacity—crawler or rubber mounted. Let your Insley distributor "show you an Insley at work."

Recognized as standard equipment by highway contractors for excavating and trenching—Insley's proven design characteristics give the contractor a dependable machine—simple to service, easy to maintain. Insley's rugged dependability means minimum down-time and more production hours.

INSLEY MANUFACTURING CORP. • INDIANAPOLIS, IND.

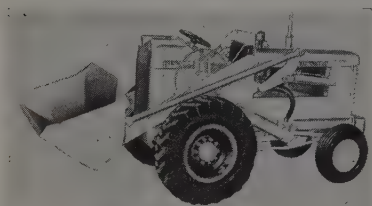
Wholly owned subsidiary / THE MAXI CORP. • LOS ANGELES



rock drill simultaneously. Instead of the usual operating speed of 1,800 rpm, the Roto Air Plus has a full load speed of 1,700 rpm., with resultant fuel savings and lengthened engine and compressor life. Two-stage compression and tube-finned multipass oil cooler result in air temperatures at the manifold 100 deg. cooler than in the most efficient reciprocating type compressor. Complete catalog and information may be obtained by writing the Jaeger Machine Co., Columbus 16, Ohio.

New front-end loader

Adding to their line of front-end loaders the Tractomotive Corp., Deerfield, Ill., has introduced the TL-11 Tractor-Loader. The 1½-cu. yd. machine has front wheel drive and rear wheel power steering. As with the company's other models it has a 3 to 1 torque converter and a clutch-type transmission which per-



mits changes in the direction of travel without shifting gears. At the normal carrying height of 3 ft. the

bucket can be tipped back to an angle of 41 deg. At ground level, the bucket can be tipped back 22 deg. Overall length of the TL-11 with the bucket in the carrying position is 15 ft. 4 in. In this position the machine can turn in a radius of 12 ft. 3 in. More information is available.

Coupling for pressure mains

A new coupling for water pressure mains, designed and marketed by Keasbey & Mattison Co., makes it possible to lay more "Century" asbestos-cement pipe per hour than ever before. The coupling consists of an asbestos-cement sleeve with 2 circumferential grooves in the bore and 2 taper-molded rubber sealing rings with holes in their inner faces. In assembling a joint, the rings are placed in the grooves and the pipe ends are inserted in the coupling. Fluid under pressure in the pipe enters the holes and expands the rings against the pipe and coupling walls, forming a tight seal. Keasbey & Mattison, Ambler, Pa.

Abrasive cleaning tool

Now on the market is a self-contained abrasive cleaning tool which weighs 11 lb., including abrasive. Called the Educt-O-Matic, it allows operation inside tanks, on ceilings, floors, cleaning before and after weld, and on many other difficult main-

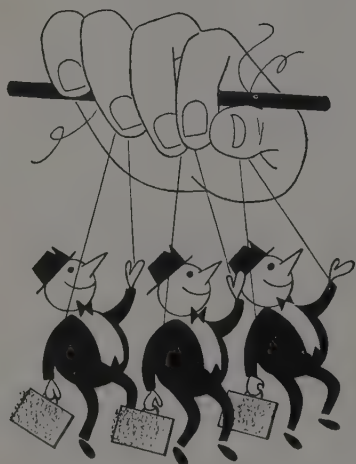


tenance situations. Dust is drawn into an attached bag which allows the abrasive to re-enter the hopper for re-use. There is no dust or flying abrasive. The device operates on 33 to 60-cfm. air supply. Clementina Ltd., 2277 Jerrold Ave., San Francisco, Calif.

Steel platform bodies

A line of steel platform bodies, featuring distortion-free body floor surface, fully enclosed reinforced stake pockets and recessed stake pocket lips for tight sideboard sealing, has been announced by Galion Allsteel Body Co., Galion, Ohio. Three platform body model series are available, each offered in lengths of 12 to 16 ft. Model 4N-3, for use with model 7-DS hoist, has an understructure of 3-in. channel crossmembers and 7-in. channel longitudinals. Model 4N-4, with 4-in. channel crossmembers and

**Want to keep dealers
at your finger tips?**



The answer's in the YELLOW PAGES!



Frankly, we can't put dealers, wholesalers, distributors at your finger tips. But we can and do put them as close as your telephone—which is at your finger tips. And to make them still easier to find, we try to make sure that what you want to know about them appears in the Yellow Pages. There you will find names, addresses, telephone numbers and, very often, the names of the brands they carry, hours of business and other helpful information. As we said, the answer to many of your problems is at your finger tips.

You'll find it fast in the . . .



Pacific Telephone

'YELLOW PAGES'



Firestone NYLON TIRES



MOVING 60,000 CUBIC YARDS A DAY TO HELP TAME THE MIGHTY MISSOURI

THE earthmoving unit shown above is typical of the many Firestone equipped units that are running round the clock to speed construction of Oahe Dam on the Missouri River. When completed, Oahe Dam will be the largest rolled filled earth dam in the world.

It is on projects such as this that Firestone nylon tires prove their superiority in reducing tire costs and downtime.

Firestone nylon tires are built for the toughest service. The treads give maximum traction and

they are extra tough to resist cutting. Double-thick sidewalls give added protection against cuts and snags.

Firestone's Safety-Tensioned Gum-Dipped nylon cord body gives greatest protection against impact breaks . . . flex breaks . . . heat failures . . . and water damage.

Let your Firestone Dealer or Store show you how Firestone nylon tires will cut downtime and increase the profits on your job.



A TIRE FOR EVERY ROAD, LOAD AND CONDITION OF SERVICE



GROUND GRIP GG WIDE BASE ROCK GRIP RG WIDE BASE ALL NON-SKID ALL TRACTION RIB EXCAVATOR

WHEN YOU BUY NEW EQUIPMENT OR REPLACEMENT TIRES, SPECIFY FIRESTONE

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GORMAN-RUPP Self-Priming Centrifugal Pumps



PETER KIEWIT SONS' COMPANY rely on Gorman-Rupp Pumps to handle Charles River seepage on relief sewer project near Boston.

DEWATERING INSURANCE

Work must go on. It *does* with Gorman-Rupp Pumps on the job. They pump out water, dry out excavations fast. In fact, Gorman-Rupp guarantees its pumps to handle more dirty water more hours, using less gasoline and to prime quicker than any other self-priming pumps of similar size.

Engine- and motor-driven pumps available from 1½", 5850 G. P. H. to 10", 240,000 G. P. H. capacities. Ask for bulletin 8-CP-11.



Model 36A-JF, on above project, has an A. G. C. rating of 90,000 G. P. H. at 25' TDH.

See listing below for your Gorman-Rupp Distributor

Anderson Machinery Company
Portland

Andrews Equipment Service of Washington, Inc.
Spokane

Bay Cities Equipment Company
Oakland

Flaherty Equipment Company
Pocatello

Harron, Rickard and McCone of Southern California
Los Angeles

Industrial Tractor Sales
North Sacramento

Mid-State Equipment Company
Wenatchee

Pacific Hoist and Derrick Company
Seattle

Studer Tractor and Equipment Co.
Casper



THE GORMAN-RUPP COMPANY
305 Bowman St., Mansfield, Ohio

8-in. channel longitudinals, mounts on model 75-DS hoist. For service with the model 880 hoist, the manufacturer recommends model 4N-5 with 4-in. channel crossmembers and 5-in. I-beam longitudinals. Payload capacities range from 9 to 15 tons.

Tilting mast for Moto-Bug

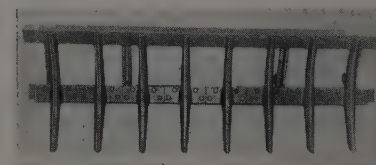
The Kwik-Mix Co., subsidiary of Koehring Company, Port Washington, Wis., has announced an improvement to its model S-10 Moto-Bug. Future models of the 3-wheel fork lift unit can be equipped with an optional double acting hydraulic valve that enables an operator to tilt



the mast and raise loads with one hand. With the attachment the Moto-Bug mast can be tilted 10 deg. toward the rear to assure better load balance or 2 deg. forward to aid in picking up or releasing a load. Complete descriptive literature, specifications, and prices can be obtained from any Kwik-Mix distributor or by writing directly to the company.

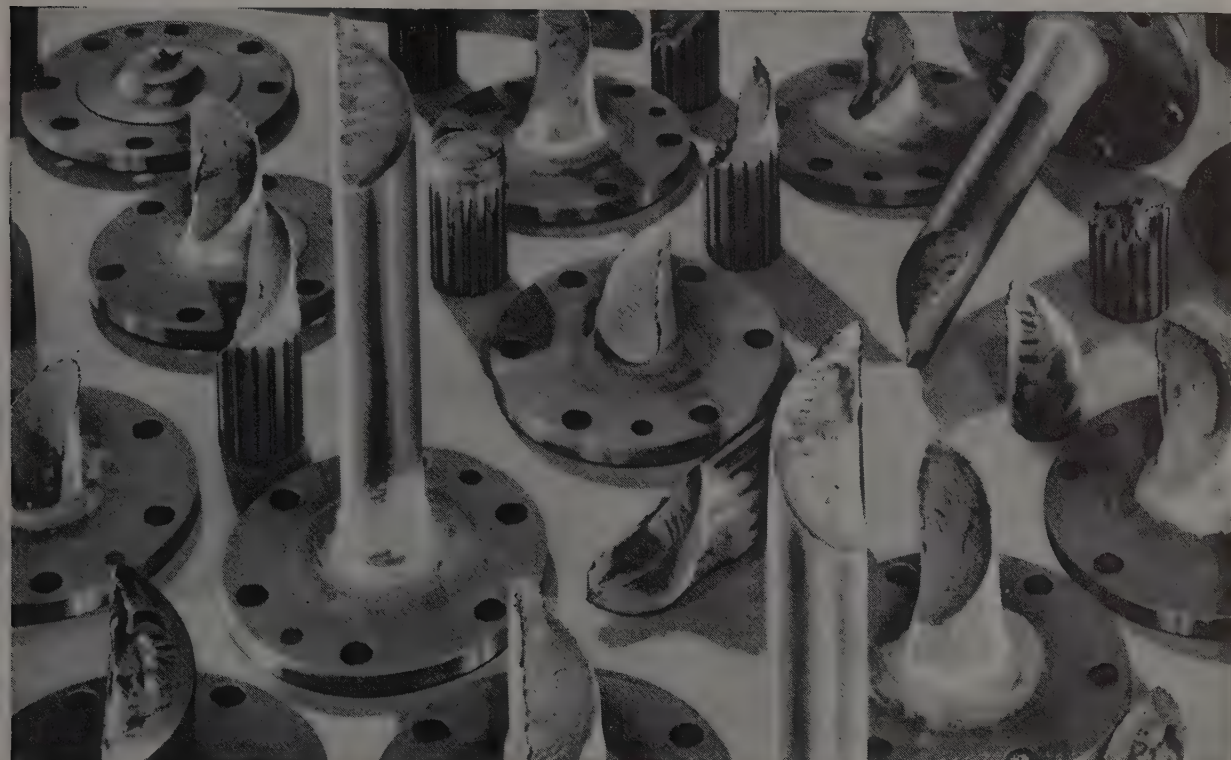
Tool bar rake for Cat D4

A Fleco Rake designed for use with a Caterpillar D4 tractor equipped with No. 4 tool bar increases the clearing and raking capacity of the tractor. The rake, developed by **Fleco Corporation**, Jacksonville, Fla., is matched to the D4 and can be installed easily on the swinging draft members of the No. 4 tool bar. The rake penetrates up to 12 in. of ground



and combs roots, branches, and trees from the soil stacking the debris in dirt-free piles that can be readily burned. The rake is available from Caterpillar dealers.

We broke these truck axles in the lab...



to save you the BIG money!

Pictured above is a group of once fine and costly INTERNATIONAL axle shafts that have been purposely twisted and broken. This is done to make sure your INTERNATIONAL rear axle will last longer and save you the BIG money—the over-the-years operation and maintenance money.

This rigorous axle-twist test is but one of many operations in the chain of INTERNATIONAL engineering that makes INTERNATIONALS *all-truck*. There are no passenger car compromises *anywhere* in INTERNATIONAL design, no passenger car engines or components asked to do a truck job.

And beyond this big plus of all-truck design, INTERNATIONAL gives you functional, practical, money-saving styling—extra comfortable driver-saving cabs—every modern driving feature.

If you use a truck to make money, see your INTERNATIONAL Dealer or Branch and start saving the BIG money!

INTERNATIONAL HARVESTER COMPANY • CHICAGO

**INTERNATIONAL[®]
TRUCKS**



In the INTERNATIONAL Engineering Laboratory, axle shafts are tested by twisting them back and forth—hundreds of times—at stress points far beyond those of any normal truck operation. Axle shafts are approved for manufacture only when they withstand a prescribed high number of twists. Production line axle shafts must conform to the quality standards set up by this rigid test.



Model S-184 LOADSTAR[®] GVW 22,000 lbs. In the world's most complete line, there are trucks for every construction job, 4,200 lbs. to 90,000 lbs. GVW, with thousands of variations for exact job specialization.

***All-Truck Built to
save you the BIG money!***

Motor Trucks • Crawler Tractors • Industrial Power
McCormick[®] Farm Equipment and Farmall[®] Tractors

News of DISTRIBUTORS

Air Mac, Inc., news

Stanley B. McDonald, president of Air Mac, Inc., Seattle, Wash., announces that their Spokane office has taken on representation of the complete line of P & H shovels and cranes manufactured by Harnischfeger Corporation. The area covered from Spokane includes all of northern Idaho down through Idaho County, and in the state of Washington everything east of the Columbia River, including Okanogan County.

Harlan Lemmer and Bill Brokaw have joined the Air Mac organization both with more than seven years' background with P & H shovels. Lemmer is working as a salesman at Spokane under John T. Little, Jr., the manager there. I. H. "Red" McGinnis, Howard Clayton, A. D. Todd (Missoula), and R. R. "Dick" Anderson (Yakima), are other salesmen in the Spokane branch. Air Mac, Inc., maintains five offices besides Spokane: Seattle, Yakima; and Portland, Eugene, and Medford in Oregon.

Exclusive distributor named

Pettibone Mulliken Corp. has appointed West Coast Engine & Equip-

ment Co., Berkeley, Calif., and their affiliated companies in Sacramento, Stockton, and Fresno, as exclusive distributors for the products of Pettibone Mulliken, Pettibone Wood, Pettibone New York, Universal Engineering Corp. and Haiss Manufacturing Co. in all of Northern California. Announcement of this appointment comes from A. E. Amley, Pettibone Mulliken Corp.'s district sales manager on the West Coast.

Tenth anniversary marked

The Brookman Co., Inc., San Francisco, a leading distributor of building materials and construction specialties, recently celebrated the tenth anniversary of the founding of the firm. J. A. Mancini heads the company as president.

Phoenix firm appoints three

The following announcements are made by Min-A-Con Equipment Co., Phoenix, Ariz. David Ray has been appointed general service manager. His many years of service in the construction field and his knowledge of Euclid and Detroit Diesel products suit him ideally for his new responsibilities. Thomas E. Russell was appointed manager of the parts department. He joins Min-A-Con

with many years of experience in the heavy-duty parts business in Arizona. George L. Carrison recently joined the firm as office and credit manager.

Exclusive representation

Announcement of appointment of additional exclusive sales representatives for Kue-Ken crushers is made by Don Kueneman, president of Straub Manufacturing Co., Inc., Oakland. For the territory of Arizona, O. S. Stapley Co., Phoenix; for Colorado and New Mexico, Union Supply Co., Denver; and for the state of Wyoming, Moss Equipment & Supply Co., Casper.

New termite drill representative

H. L. Hutchinson Co., Portland, Ore., has been appointed a stocking agent for the products of Termite Drills, Inc., Pasadena, Calif. Complete stocks of Termite rotary masonry drills are now available for shipment from the Portland firm.

New outlet for Yale products

The Yale & Towne Manufacturing Co., Lock and Hardware Division, announces the appointment of Los Angeles Hardware Co. as a distributor for Yale products. The Los Angeles firm was formed in July 1955 by Harry Fiske and Leonard Small to provide an expanded service for contractors in the Los Angeles area.

News from Oregon distributor

C. J. Guthrie has been appointed general sales manager at Cramer Machinery Co., Portland. John Mills is now manager of the service and parts department. The following new lines were recently acquired by the company: Industrial Chemical Co. of Los Angeles; Gen-A-Matic, generators and post hole diggers; and L. R. Murphy Scale Co. of Sacramento, Calif.

Reno area distributorship

Air Service Co., 241 S. Virginia St., Reno, Nev., was recently named distributor for D. W. Onan & Sons, Inc., products.

MANUFACTURERS

Napco's new plant

Napco Industries, Inc., Minneapolis, Minn., manufacturing and supply firm, last month celebrated the formal opening of its Federal Motor Truck Division, whose facilities have been moved from Detroit, Mich., to the new plant at 834 North Seventh St., Minneapolis. More than doubling its capacity, Napco's new facilities provide 1,000,000 sq. ft. of



FRED L. MOSIER (left) and P. H. Howard, co-owners of the Fresno Trailer Co., celebrate the opening of their new building at Jensen and East Avenues in Fresno, Calif. Fresno Trailer Co. is the distributor for White and Autocar trucks.

BLAW-KNOX SIMPLIFIED FORMING METHODS ELIMINATE TWO EXPENSIVE STEPS . . .

ON THE UNIVERSITY OF WISCONSIN'S BIG NEW FIELD HOUSE. For this long, wide structure which has to be free from central supports to accommodate football games or ROTC battalion formations, a relatively unique method of construction was required.



Fitzhugh Scott and
Fitzhugh Scott, Jr.,
Architects

Ammann & Whitney,
Consulting Engineers

When you have a tough forming contract, discuss your problem with Blaw-Knox engineers in the preliminary planning stage. Blaw-Knox has probably solved similar problems and saved money for other contractors. There's no substitute for practical assistance when the going gets rough — call in the Blaw-Knox Steel Forms Consultation Service to save money on your next concreting job.

BLAW-KNOX COMPANY

STEEL FORMS DEPARTMENT • BLAW-KNOX EQUIPMENT DIVISION
P.O. BOX 1198 • PITTSBURGH 30, PA. • PHONE STERLING 1-2700

**BLAW-KNOX
STEEL FORMS
CONSULTATION
SERVICE**



The Problem:

To build a concrete arch type building 400 feet long by 200 feet wide, measuring 15 feet high at the sidewalls and 68 feet from the crown of the arch to the dirt floor . . . with no supporting columns or trusses for the thin shell concrete arch and rib beams. The lowest possible construction cost was imperative.

The Solution:

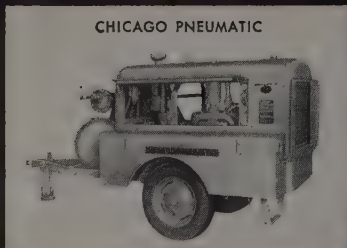
BLAW-KNOX STEEL CENTERING

and Blaw-Knox engineers solved the problem at substantial savings.

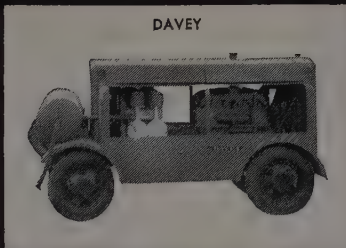
First, falsework for the roof arch was designed to be reused 7 times. It was simply moved forward after completion of each pour.

Then, Blaw-Knox engineers considered it more economical to convert the falsework to a tied arch for moving purposes only, thereby eliminating additional sets of steel rail track otherwise required for the central columns. This one feature alone saved costly time and materials. Only two tracks are required instead of the 4 to 6 sets of rails that would normally be necessary to support the 200 tons of centering and move the central columns.

CHICAGO PNEUMATIC



DAVEY



POWER by HERCULES

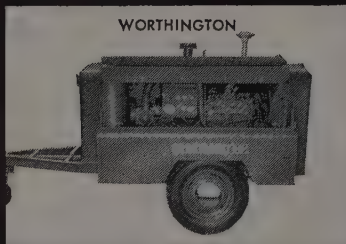
OK COMPRESSOR



GARDNER-DENVER



WORTHINGTON



You can see . . .

HERCULES ENGINES are popular... but let's talk performance.

Popularity isn't the only reason Hercules Engines power these well-known makes of air compressors. The main reason these companies select Hercules Engines is that they provide dependable power—engineered to the requirements of the compressor.

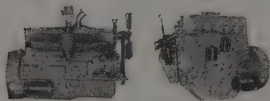
Air compressors, like other types of equipment, are designed by the manufacturer for specific capacities. They need an engine that will produce the rated power as well as a power plant to fit the operating features of the application.

Then too, owners appreciate the dependable service and "trouble-free" operation of Hercules Engines. They know that with routine maintenance, their Hercules powered equipment will give them years of "top-notch" performance.

With the addition of the recently announced G.O. Series (Gasoline Overhead Valve) and the D.D. Series (Direct Injection Diesel), Hercules customers have an even greater selection of internal combustion engines and power units. More than 90 different models are available from 3 to 500 H.P. for operation on natural gas, gasoline or diesel fuel.

Hercules Sales-engineers will be glad to assist you in solving your particular power problems. Drop us a letter, we'd be most happy to work with you—of course, there's no obligation.

All Types of Dependable Power



Gasoline



Diesel

HERCULES MOTORS CORPORATION, Canton, Ohio

space for production, offices and storage. Five divisions are now housed here, among them the Construction Equipment and the Highway Safety Appliances divisions.

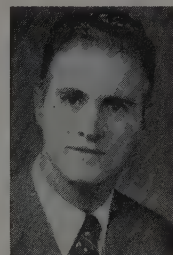
The Construction Equipment Division manufactures a line of heavy duty, front-end loaders for use in the construction industry. This division was recently elected to membership in the Associated Equipment Distributors, a national organization of manufacturers and dealers in heavy equipment. The Elston sander, a safety device for use on trucks, is manufactured by the Highway Safety Appliances Division.

Heede opens Western office

B. M. Heede, Inc., of New York, has opened an office in San Francisco, at 260 Kearny St., in order to offer greater service to the Western construction industry in solving problems related to slipform construction and to offer for rental the Concretor hydraulic lifting equipment produced by the company.

Thor elevates two

John A. McGuire, vice president of labor relations of Thor Power Tool Co., Aurora, Ill., has been elected to a full vice presidency of the company. He has been a member of the Thor



McGuire



Smith

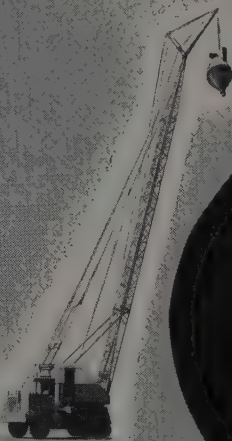
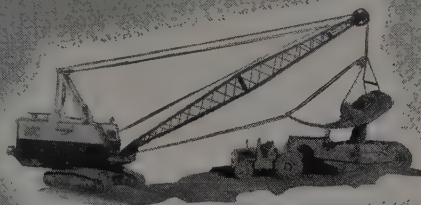
organization since 1939, starting in the accounting department. Dean C. Smith who has been serving as general manager of the Aurora works has been elected vice president of manufacturing.

Athey adds district representative

Newly appointed district representative in the Southwest for Athey Products Corp., Chicago, Ill., is Charles Z. Holmes. A former resident of Portland, Ore., Holmes' experience in the construction and earth-moving business includes employment on a survey crew, branch manager for an Athey-Caterpillar dealer, general superintendent of two large Western contractors, and district representative for the Hyster Company.

New position for Don Douglass

Appointment of Don Douglass to the newly made post of parts sales manager of The Thew Shovel Co., Lorain, Ohio, is announced by A. C. Lundgren, vice president. Douglass assumes responsibility for sales and



MARION

Announces



HEADQUARTERS FOR THE FOLLOWING MACHINES

	Shovel (Cu. yds.)	Crane (tons)	Hoe (Cu. yds.)
MARION 32-M	$\frac{3}{4}$	17½*	$\frac{3}{4}$
MARION 43-M	1	27*	1-1½
MARION 362	1½	37	1½-2
MARION 372	—	43	—
MARION 83-M	2	60	2-2¼
MARION 87-M	—	75	—
MARION 93-M	2½	80	—
MARION 101-M	3	84	—
MARION 111-M	4	169	—

*Rated at 10' in accordance with general practice.

MARION POWER SHOVEL COMPANY

MARION, OHIO, U.S.A.

POWER SHOVELS FROM ¼ TO 4 CUBIC YARDS • DRAG-
LINES • CLAMSHELLS • LOG LOADERS • PILE DRIVERS
CRANES, CRAWLER AND RUBBER MOUNTED • BACKHOES

The Appointment of A New Distributor to Cover

*the entire state of California, Clark County,
Nevada and Yuma County, Arizona*

George M. Philpott Co., Inc.

Sales and Service Offices at

1060 Bryant Street

San Francisco 3, California

Phone: HEmlock 1-5475

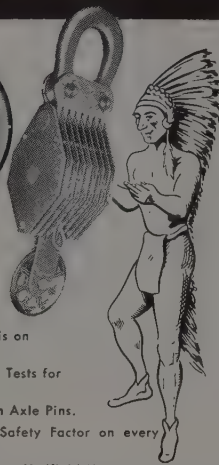
376 South Railroad Avenue
Fresno, California
Phone: Fresno 6-9843

125 North Vineland
Pueente, California
Phone: Edgewood 6-8096

2928 Poplar Street
Oakland, California
Phone: Glencourt 2-0458

6260 Folsom Boulevard
Sacramento, California
Phone: GLadstone 2-2641

SKOOKUM BLOCKS and FORGINGS



- ★ Timken Mill Analysis on Forging Steel.
- ★ Rockwell and Other Tests for Proper Temper.
- ★ Stress-Proof Steel in Axle Pins.
- ★ At least a 5-to-1 Safety Factor on every Skookum Block!
- ★ Work-Hardening, True Hadfield Manganese Steel Sheaves to Eliminate Line-Wear. Cast Steel Sheaves Specially Control-Tested.

SKOOKUM will build ANYTHING in a BLOCK or FORGING

Write for full information on
Skookum Blocks, Fairleads and Forgings TODAY!



distribution of parts for Lorain products here and abroad and for the recently acquired line of Byers shovels and cranes.

Kaiser plant gets recognition

Kaiser Steel Corp.'s fabricating division plant at Napa, Calif., was recently awarded a \$2,000,000 contract to build most of the major equipment for the manufacture of large-diameter steel line pipe (20-36 in.) for a new pipe mill to be located at Welland, Canada, according to announcement by Ernest Ilsley, general manager of the fabricating division plants.

Blackburn joins Stran-Steel

C. V. Blackburn has been appointed vice president, sales, Stran-Steel Corporation, as announced by Charles LeB. Homer, president of the firm. Blackburn comes to Stran-Steel from General Electric Co., which organization he joined 21 years ago on completion of college. He replaces J. E. Bowen who recently resigned.

New Canadian pipe plant

The formation of Alberta Phoenix Tube & Pipe Limited in Edmonton, Alberta, Canada, which is building a pipe and tube plant scheduled for completion this year, was recently announced by Maximilian B. Bauer, a director of the company and repre-

sentative of Phoenix-Rheinrohr AG, Germany. The Canadian company was formed as the result of an agreement between William G. Gilmore, San Francisco; Frank McMahon, Edmonton, and the German pipe producer to satisfy the demand for line pipe in western Canada. The project is being built by International Bechtel, Inc., at a cost of \$6,500,000. Frank McMahon was elected president of the new company.

Lovegreen made asst. sales mgr.

Appointment of Harold A. Lovegreen as assistant sales manager of Calaveras Cement Co. is announced. He will work directly with Mel J. London, vice president in charge of marketing, and with William G. Jeffrey, Jr., dealer sales manager, and will make his headquarters in the San Francisco office.

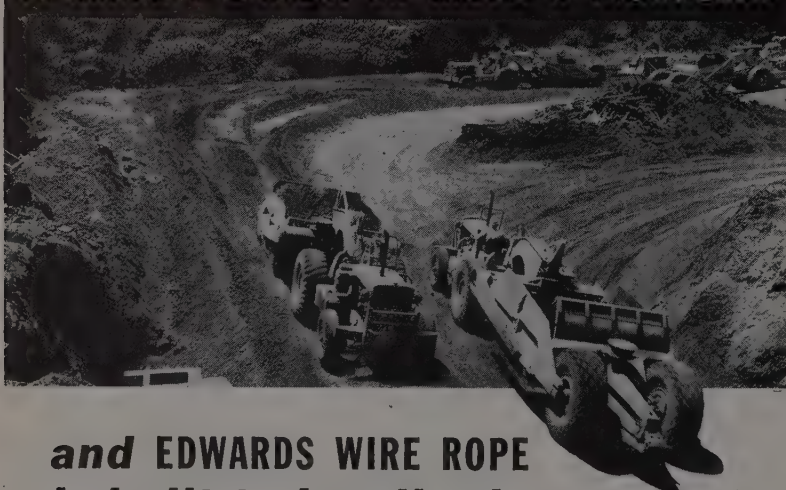
D. J. Clymer made ad manager

Detroit Diesel Engine Division, General Motors Corp., through Robert E. Hunter, general sales manager,



D. J.
Clymer

It takes POWER to move a mountain



and EDWARDS WIRE ROPE is built to handle that power!

Heavy construction equipment is getting bigger, faster and heavier. You need the "built-in" extra performance of Edwards Wire Rope to keep shovels, scrapers and dozers operating profitably.

Call or write today for the address of your nearest Edwards Distributor.

EDWARDS WIRE ROPE E. H. EDWARDS COMPANY

General Office: SOUTH SAN FRANCISCO, CALIFORNIA
Seattle • Portland • Los Angeles • Houston



announces the appointment of D. J. Clymer as advertising manager. Clymer joined Detroit Diesel in 1943, and most recently was assistant to the advertising manager.

Chief engineer transfer

Byron C. Redeen has been appointed chief engineer at Lippman Engineering Works, Milwaukee, Wis., and took over the duties of the office Jan. 20. Redeen joined the engineering staff at Lippman in 1944, becoming chief engineer in 1946. In 1950 he transferred to field engineering where he has operated as the company's chief sales engineer for the past five years.

Official changes at Joy

J. D. A. Morrow recently retired as president of Joy Manufacturing Co., Pittsburgh, Pa., and was elected as chairman of the board of directors. John Lawrence was advanced to president and chief executive officer; W. L. Wearly to executive vice president, and H. C. Nyquist to vice president, general sales. Morrow has served as president since 1940. Lawrence came to Joy as vice president, manufacturing, in 1951 from SKF Industries, Inc. For the past year and a half he has been executive vice president. Wearly has been with Joy since 1937, and the last three years has been vice president, general sales. Nyquist

TRACTOMOTIVE TL-10 TRACTO-LOADER

Capacity — 1 cu yd
Horsepower — 63
Reach — 2 ft, 7½ in.
(at 8-ft dumping clearance)
Weight — 11,700 lb



... tires do not extend ahead of cowl to rob you of valuable reach

HIGH LIFT... LONG REACH... LOW CARRY

More output on every materials handling job

You reach high and dump loads right in center of truck with the Tractomotive TL-10 Tracto-Loader. No wasted time bulldozing to distribute load. That's because the TL-10 utilizes the full distance between cowl and bucket. Tires do not extend ahead of cowl to rob you of valuable reach.

You get and carry full loads, too, with tip-back bucket. Gives you a scooping action getting load and a low carry position for better visibility, great stability, easier maneuvering. But these are just a few of the many TL-10 advantages.

Hydraulic torque converter drive lets you crowd steadily into the pile — engine torque is multiplied three times. Tip-back feature gives a scooping action that fairly tumbles material into bucket. With clutch-type transmission, you pull a lever and move away from the pile on the double without time out for shifting. Reverse is almost twice as fast as forward! Bucket over drive wheels utilizes weight of loaded bucket for greater traction while it eases weight on rear wheels for easier steering.

Make an appointment for a demonstration. See how these big-production features will help you increase output.

SOLD AND SERVICED BY YOUR ALLIS-CHALMERS CONSTRUCTION MACHINERY DEALER

ARIZONA

Neil B. McGinnis Equipment Company—Phoenix

NORTHERN CALIFORNIA

Industrial Tractor Sales—Sacramento
Shasta Truck & Equipment Sales—Redding
Buran Equipment Company—Oakland and Santa Clara
Aikins Tractor Co.—Eureka

SOUTHERN CALIFORNIA

San Joaquin Tractor Co.—Bakersfield
Shaw Sales & Service Co.—Los Angeles and San Diego

IDAHO

Southern Idaho Equipment Co.—
Idaho Falls and Twin Falls
Southern Idaho Equipment Co. of Boise, Inc.—Boise

MONTANA

Mountain Tractor Company—Missoula
Richland Machinery Company—Sidney
Saitz Machinery Company, Inc.—
Billings and Great Falls

NEVADA

A D Machinery Company, Inc.—Elko and Las Vegas
Reno Equipment Sales Co.—Reno

OREGON

Pape Brothers—
Eugene, Roseburg and North Bend
Hauptert Tractor Company—
Medford and Klamath Falls

Wood Tractor Company—Portland

UTAH

Cate Equipment Company, Inc.—Salt Lake City

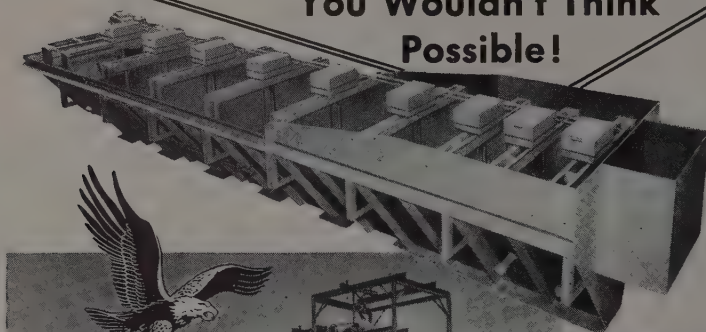
WASHINGTON

A. H. Cox & Company—Seattle
American Machine Company—Spokane
Mid-State Equipment Company—Wenatchee

WYOMING

Studer Tractor & Equipment Company—Casper

The EAGLE Water Scalping-Classifying Tank Gives You Classification You Wouldn't Think Possible!



THE EAGLE Complete Washing-Classifying-Dehydrating Section at the eastern aggregate plant shown, has a 24' tank equipped with 9 automatic, power-operated bleeder valves. Pit run sand is segregated into 9 distinct classifications, each flowing from one of the 9 valves.

"Splitter" gates below each valve, in conjunction with the Multi-Cell Collecting-Blending Flume below the tank, permit directing of any percentage from each valve to any of the three Eagle Screw Washer-Classifiers-Dehydrators. Or, any percentage from any valve can be wasted. Complete flexibility to produce any gradation—or variety of gradations—material to meet specifications.

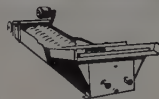
You can increase the efficiency of your present Eagle Fine Material Washer or Washers—or other make—by installing an Eagle Water Scalping-Classifying Tank—whether yours is a dry pit operation, as shown, or a pumping operation. Send for the facts in Catalog 55.

EXPERIENCE, PROGRESS, SERVICE SINCE 1872

EAGLE IRON WORKS, 203 HOLCOMB Ave., Des Moines, Iowa

Brown-Bevis Industrial Equip. Co., Los Angeles, Calif.; Coast Equipment Co., San Francisco, Calif.; P. L. Crooks & Co., Portland, Oregon; Intermountain Equip. Co., Boise, Pacatello, Ida.; Spokane, Wash.; Keremi Tractor & Equip. Co., Cheyenne, Casper, Wyo.; The Long Co., Salt Lake City, Utah; H. W. Moore Equip. Co., Denver, Colo.; Jack Sahiberg Equip. Co., Seattle, Wash.; Shriver Machinery Co., Phoenix, Ariz.; Sierra Machinery Co., Reno, Nev.; N. C. Ribble Co., Albuquerque, N. Mex.; Western Construction Equip. Co., Billings, Missoula, Great Falls, Bozeman, Mont.

The EAGLE LINE



FINE MATERIAL WASHERS



COARSE MATERIAL WASHERS



LOG WASHERS



WATER SCALPING—CLASSIFYING TANKS.



"SWINTEK" DREDGE LADDERS



COMPLETE DREDGES



BREAKER BALLS & PILE HAMMERS.

joined the company in 1946. He has served as a district sales manager and later as vice president, coal machinery sales.

Marks made Permanente v.p.

William Marks, secretary of Permanente Cement Co., Oakland, Calif., has been named vice president and secretary of the company. He has been a member of the Kaiser organization since 1942.

Chain Belt promotions

Two promotions at Chain Belt Co., Milwaukee, Wis., are announced by A. R. Abelt, vice president, sales. W. B. Marshall, formerly sales pro-



Marshall

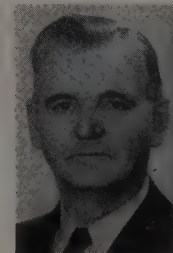


Pfeifer

motion manager, has been named to the new position of manager, market development, and sales training. G. H. Pfeifer is appointed to the new post of manager, sales promotion, and advertising. He formerly held the title of advertising manager.

Seaman establishes new company

A new firm, known as Seaman Engineering & Research Corp., with headquarters in Milwaukee, Wis., has been established by Harry J. Seaman. According to Seaman, the new firm is established to pursue extensively the further study of soil stabilization and related mechanization.



Harry J. Seaman

Founder and sole owner of the well known firm of Seaman Motors, Inc., which he sold a year ago, Seaman brings to his new venture a wide background of practical experience, and reports he intends to devote his knowledge to the design and development of new types of road building equipment.

New dealer sales manager

Leslie B. Schramm, sales manager of Schramm, Inc., manufacturer of



S & M Construction Company, Providence, R. I., uses 12 of these Mack LJSWX diesel dumpers under 2-yard Lorain shovel in excavating peat bog near Atholl, Mass., on a by-pass for U. S. Route 20.

ONLY A SPECIALIST NEED APPLY...

... For only Macks can get in and out of mud like this under their own power!

Axle deep in soft, soupy mire and hauling a full load of heavy peat bog, 80% water, this Mack dumper will pull out of the muck and be on its way . . . and back again on schedule.

It's Mack's famous Balanced Bogie, along with Mack's exclusive Power Divider, that makes seemingly impossible tasks like this everyday assignments for Macks. This wonder-working team delivers torque to each wheel in proportion to its

traction. In addition, it assures uniform tire loading and braking on all four rear wheels, and maximum stability under any terrain or road conditions.

When you add the Balanced Bogie and Power Divider to Mack's rugged construction, ease of maintenance, and economy of operation, you'll see why Macks are the most versatile trucks, the biggest money makers in the construction industries today. See your Mack Branch or Distributor for complete details.

MACK TRUCKS — Los Angeles • Denver • San Francisco • Seattle • Portland • Salt Lake City • Albuquerque



IT WILL TAKE eight sections like these to complete the new fifth kiln now being erected at the San Andreas plant of Calaveras Cement Co. The sections, each 45 ft. long, are being shipped at 3-day intervals from Bethlehem Pacific's San Francisco shipyard. The section above is shown upon arrival at the cement plant. Grant Metzger, Calaveras plant manager, is at right.

air compressors in West Chester, Pa., announces the appointment of P. F. Smith, IV, as dealer sales manager. He is succeeded in his former posi-

tion as manager of Pneumatic & Electric Equipment Co. (PEECO) in Philadelphia by George A. Naab.

Expansion planned

Brunner & Lay, Inc., Franklin Park, Ill., announces a \$1,000,000 expansion program which will include a new plant location, a new plant at an existing location, building additions, and the purchase of additional production equipment.

Yale names Goldenson branch mgr.

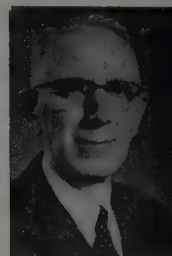
L. W. Goldenson, a veteran of more than 10 years' experience in sales, service, and engineering of materials handling equipment, has been named manager of the San Francisco sales and service branch of Yale Materials Handling Division, The Yale & Towne Manufacturing Co. The branch is temporarily located at 563 Second St., San Francisco, where Yale hoist sales offices are maintained under the direction of Harry F. Rose, regional sales manager. As branch manager, Goldenson replaces Harold N. Stiles, who has taken on another assignment at company headquarters in Philadelphia.

New branch manager

Paul Watts has joined Skil Corporation, 285 South Van Ness Ave., San Francisco, as branch manager, succeeding Herman Pflug.

Royce again in the field

Bert Royce, who in the early part of the century introduced the mechanical ditcher to hundreds of contractors throughout the United States, is now back in the field, representing Gar Wood-Buckeye, man-



Bert Royce

ufacturer of the world's first ditching machines. Starting his forty-sixth year with Gar Wood Industries, Inc., Royce is calling on old friends in the South and Southwestern parts of the country.

Link-Belt Speeder appointment

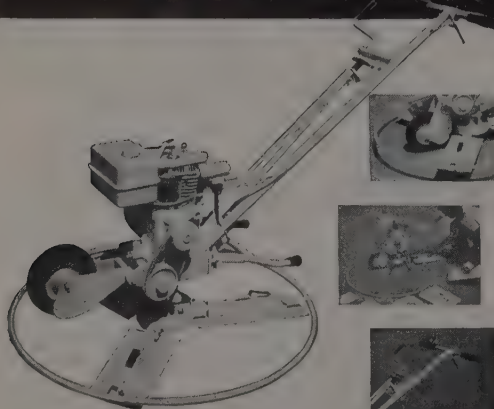
Herbert Wignall has been named parts and service manager for Link-Belt Speeder Corp., according to announcement by C. M. Basile, vice president in charge of manufacturing and sales. Wignall has been affiliated with this Cedar Rapids, Iowa, shovel-crane manufacturer for the past ten years.

Pacific Northwest appointment

Gordon K. Wilson of Seattle has been appointed assistant division sales manager, Pacific Northwest Division of Permanente Cement Co.,

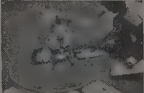
Only one man to move a

White TROWELER





Retractable wheel, up to trowel, down to move.



Remove blades and ring in seconds... for cleaning, changing blades, or moving through doorways.



Adjust blade pitch during rotation from handle. Safety throttle control stops rotation if operator lets go handle.

PORTABILITY, patented, exclusive! PERFORMANCE, unbeatable! PRICE, comparable to trowelers *without* these features! Model T-1, 36" diameter, Patent No. 2,621,568.

White MANUFACTURING COMPANY

ELKHART 15, INDIANA

Some Dealers' Territories Available—Write Today

In 11 years, 7½ million tons were hauled—at less than ½¢ per ton!



A large Southern cement company decided in 1942 to install a conveyor belt system to carry Portland cement rock (90 lbs. cu. ft.). This material had previously been carried by trucks over a 2¼ mile road at a cost of over 8¢ a ton. After 5 years of operation, the belt system had paid for itself, besides keeping the plant running without worrying about gas and tires for trucks throughout the war. Estimated cost per ton was less than ½¢!

The United States Rubber Company belts were used as follows:

- **Primary Crusher Belt (U. S. Matchless®)**
- **Secondary Crusher Belt (U. S. Giant®)**
- **Seven other "U. S." Belts, ranging from 929 feet to 2399 feet, from Surge Bin to plant**

These belts ran an average of 40 hours to 84 hours a week, year after year.

Belts nos. 1 and 2 from Surge Bin were removed after 8 years. The other Surge Bin belts were replaced after 11 years and 1 month's service, and over 3000 feet sold to various sand and brick plants at \$1.50 per foot. These belts were replaced by new "U. S." belts.

"U. S." Three-Way Engineering is responsible for such a remarkable performance. "U. S." belt engineers worked closely with the designers of the conveyor equipment and the engineers of the cement company. The result, as always, is the most efficient and economical belt for the job. That is why cost-minded plant operators call on "U. S." engineering and conveyor belt experience to solve any materials-handling problem. U. S. Conveyor Belting is obtainable through any of the 27 "U. S." District Sales Offices. Or write us at Rockefeller Center, New York 20, N. Y.



Mechanical Goods Division

United States Rubber

When bridge designs can be simplified...

Have better appearance
...require less maintenance...

Yet cost less to build

WHY
shouldn't you design more for welding

Ask

**THE
LINCOLN ELECTRIC
COMPANY**

Cleveland 17, Ohio

*Pioneer in Welded Structural Design
...for Lower Costs*

Oakland, Calif. Wilson joined the Kaiser organization in 1945, became a salesman for Permanente in 1947, and was appointed senior salesman of the Pacific Northwest Division in 1951. His headquarters are in the company's division sales office in Seattle.

New regional office

To provide personal service for architects, engineers, and contractors of Southern California, Timber Structures, Inc., of California, has established a new regional office at 8845 Olympic Blvd., Beverly Hills.



**James D.
Jones**

Regional manager of the new office is James D. Jones who has had extensive experience in the construction industry, having served as sales engineer in Timber Structures' offices in Seattle, Spokane, Boise, and other sections of the country.

New sales engineer in L. A. area

The Rucker Company, one of the largest distributors of hydraulic and pneumatic equipment and fluid power systems on the West Coast, announces the appointment of Wesley A. Krueger as sales engineer for the Los Angeles area. Krueger comes to Rucker's Los Angeles headquarters from the San Francisco Bay area, where he was sales and application engineer with Mathews Conveyor Co.

CYCLONE
PORTABLE SANDBLASTER

Blast Cleans any surface with any abrasive



We manufacture a complete line of blast cleaning equipment ranging from small hand tools to Blasting Cabinets, Rooms and dust collectors.

Capable of doing any blast cleaning job with any abrasive. Our latest Model TL-200 (illustrated) is the convertible shop sand blaster and highway Traffic-Line Remover.

This profit-making line now available to Distributors in both the Domestic and Export fields. Write for particulars to:



SAFETEE PRODUCTS COMPANY
173 14th Street San Francisco 3, Calif.

Mountain region field rep

Thomas E. Stone has been named a field representative for the Le Roi Division, Westinghouse Air Brake Co., Milwaukee, Wis. Working out of Salt Lake City, Stone will represent Le Roi in Utah, eastern Idaho, and western Colorado.

Hough plant expansion

The Frank G. Hough Co., Libertyville, Ill., announces the construction of a 55,000-sq. ft. addition to its plant. The new buildings, expected to be completed this year, will give the plant a total of 368,000 sq. ft., said by the manufacturer to be the largest plant in the world devoted exclusively to the making of tractor-shovel equipment.

Cook Bros. promotes W. P. Uschyk

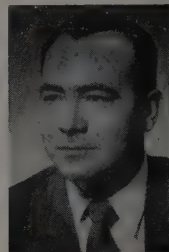
J. E. Hall, executive vice president of Cook Bros. Equipment Co., Los Angeles, announces the promotion of Walter P. Uschyk as truck sales manager in the Los Angeles area. His 20-yr. association in the truck field ably adapts him for his new responsibilities. Uschyk takes over from Ira "Curley" Hinckley, who now is in charge of sales for the newly formed rubbish equipment section of the firm.

Harnischfeger names district mgrs.

The appointments of E. J. Sullivan as district manager of the Denver office and William H. DeHuff as district manager of the San Francisco office of Harnischfeger



Sullivan



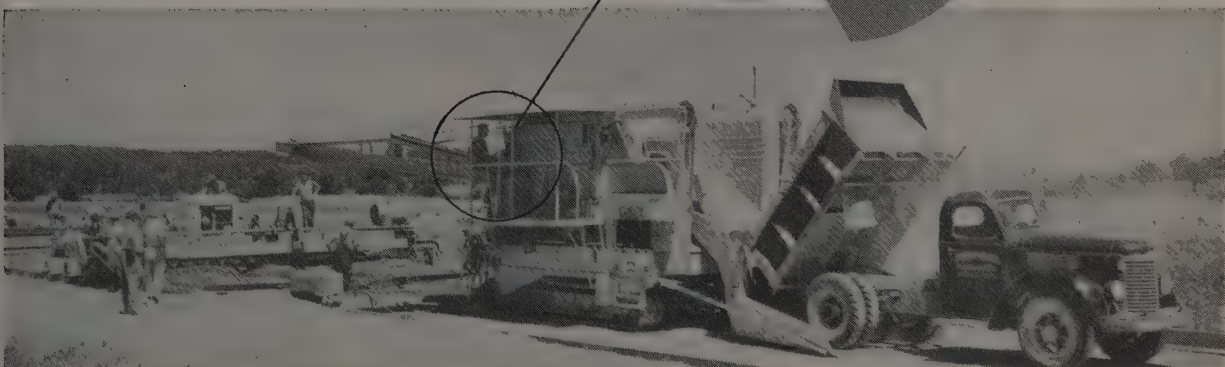
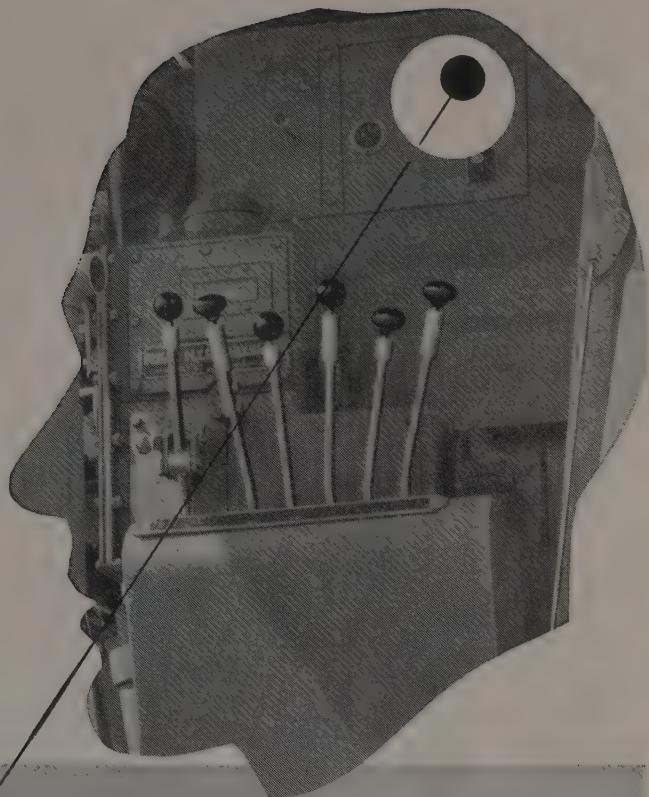
DeHuff

Corporation have been announced by B. Pratte, general manager, Pacific Division. Sullivan, who has been with P&H's Denver office since July 1950, succeeds DeHuff upon the latter's transfer to San Francisco. DeHuff takes over his new post upon the retirement from active service of L. M. Stout, who has managed the San Francisco office since 1947.

R. L. Erlin promoted

Richard L. Erlin has been appointed general sales manager of Kaiser Steel Corp.'s Fabricating Division plants at Napa and Fontana, Calif. Before being named to his present position, Erlin was manager of engineering sales for Kaiser Steel in Oakland.

Why you're
always "yards" ahead
with a **REX** Paver

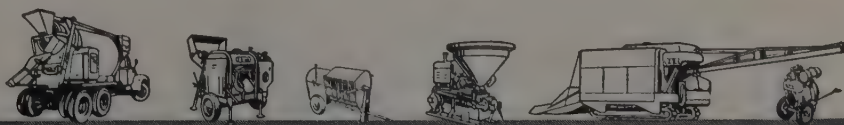


You'll finish "yards" ahead every day with a Rex... because the "hydraulic brain"—Hydrocycle Control—helps you pour more yards—faster! Hydrocycle saves you seconds every batch...you place more batches every day. That's dollars saved every day!

Hydrocycle takes over once the operator sets the batch meter...controls and operates the entire cycle. It eliminates the human element...cuts operator fatigue. There's no guesswork...no wasted seconds. The operator never has to leave his seat. He stays

fresher...more relaxed...is able to give you the same high-speed operation at the end as well as at the start of the day. And he has far more time to perform the other paver functions—travel the bucket, swing the boom, spread the batch and move the paver. It's the big reason why Rex is the fastest paver in the business...makes more profit for you!

For all the facts, see your Rex Distributor or write CHAIN Belt Company, 7601 Telegraph Rd., Los Angeles 22, California.



CHAIN BELT COMPANY

UNIT PRICES

Selected abstracts for Western projects

CANAL—Earthwork, concrete canal lining, and structures for Putah South Canal, Solano Project

California—Bureau of Reclamation. A Teichert & Sons, Inc., submitted a low bid of \$1,147,921 for earthwork, lining, and structures on the Putah South Canal. Bids were opened in Winters, California.

(1) A. Teichert & Sons, Inc.	\$1,147,921
(2) Morrison-Knudsen Co., Inc.	1,215,422
Parish Brothers, Inc., & Peter Kiewit Sons' Co.	1,231,588
John Delphia	1,268,462

			(1)	(2)
1,227,000	cu. yd.	Excavation, common, for canal	\$.25	\$.215
25,000	cu. yd.	Excavation, common, for drainage channels and ditches	.40	.40
16,300	cu. yd.	Excav., common, for structures	1.00	1.00
4,500	cu. yd.	Furnishing and placing gravel surfacing for roads	3.00	1.70
1,500	sq. yd.	Furn. & pl. bit. surf. for roads	2.00	2.25
22,000	cu. yd.	Compacting embankments	.30	.20
9,400	cu. yd.	Backfill about structures	.70	.65
4,400	cu. yd.	Compac. backfill about structures	3.00	4.50
5,700	mi. cu. yd.	Overhaul	.20	.35
310	cu. yd.	Riprap	7.00	10.50
95	cu. yd.	Sand & gravel bedding for riprap	6.00	7.00
60	cu. yd.	Coarse gravel protection	7.00	6.50
198,000	sq. yd.	Trim. found. for conc. lining	.40	.47
4,600	cu. yd.	Earth fill at top of canal lining	1.00	2.00
16,500	cu. yd.	Concrete in canal lining	15.50	17.70
2,150	cu. yd.	Concrete in structure	75.00	85.00
24,700	bbl.	Furnishing and handling cement	5.00	5.38
351,000	lb.	Furn. & placing reinforce. bars	.13	.17
214	sq. ft.	Furn. and placing $\frac{1}{4}$ in. elastic filler material in joints	2.00	3.00
69	sq. ft.	Furn. and placing $\frac{1}{4}$ in. elastic filler material in joints	3.00	4.00
106	sq. ft.	Furn. and placing 1 in. elastic filler material in joints	4.00	5.00
836	lin. ft.	Placing 9 in. Type "A" rubber waterstop in joints	1.00	2.00
70	lin. ft.	Placing 6 in. Type "H" rubber waterstop in joints	1.00	2.00
692	lin. ft.	Furn. and laying 12 in. diameter, No. 16 ga. corr-metal pipe	4.00	4.75
134	lin. ft.	Furn. and laying 18 in. diameter, No. 16 ga. corr-metal pipe	5.00	4.50
28	lin. ft.	Furn. and laying 21 in. diameter, No. 16 ga. corr-metal pipe	6.00	6.00
344	lin. ft.	Furn. and laying 24 in. diameter, No. 14 ga. corr-metal pipe	7.00	7.00
106	lin. ft.	Furn. and laying 30 in. diameter, No. 14 ga. corr-metal pipe	8.00	9.00
34	lin. ft.	Furn. and laying 58 in. by 36 in. No. 12 ga. corr-metal pipe arch	20.00	18.00
71.3	m.b.m.	Furn. and erect. untreated timber in structure	330.00	290.00
8.3	m.b.m.	Furn. and erect. treated timber in structures	400.00	340.00
465	lin. ft.	Furn. and install. metal bridge railing for county bridges	7.00	6.00
1	shelter	Furn. and erect. corrugate-metal gaging station shelter	500.00	400.00
5	cattle guard	Furn. mat. & const. cattle guards	700.00	730.00
0.5	mi.	Furn. mat. and const. barbed-wire right-of-way fences	2,000.00	2,550.00
7	mi.	Furn. mat. and constr. comb. barbed-wire and woven-wire right-of-way fences	1,500.00	1,930.00
36	gate	Furn. and installing metal fence gates in right-of-way fences	50.00	45.00
320	lin. ft.	Furn. and erect. chain-link fences	2.00	2.75
18,000	lb.	Furn. and instal. welded-steel pipe for overchutes and irriga. pipe-line crossings	.35	.47
Lump Sum	dollar	Furn. and instal. two 6 ft. 9 in. by 14 ft. 0 in. radial gates, including motor-operated hoists		
2	gate	Furn. and instal. 12 in. diameter cast-iron slide gates, incl. lifts	60.00	90.00
2	gate	Furn. and instal. 48 in. by 36 in. cast-iron slide gates, incl. lifts	1,100.00	1,175.00
3	gate	Furn. and instal. 60 by 60 in. cast-iron slide gates, incl. lifts	1,400.00	1,580.00
19,000	lb.	Furn. and instal. misc. metalwork	.60	.82
100	lin. ft.	Furn. and instal. elec. metal conduit $\frac{1}{4}$ in. or less in diameter	1.50	1.60
40	lin. ft.	Furn. and instal. elec. metal conduit 1 and $\frac{1}{2}$ in. in diameter	3.00	2.50
40	lin. ft.	Furn. and instal. elec. metal conduit 2 in. and 2 $\frac{1}{2}$ in. in diam.	5.00	4.00
30	lin. ft.	Furn. and instal. elec. metal conduit having protective coating or tape wrapp. $\frac{1}{2}$ in. in diam.	3.00	5.50
3	fixture	Installing lighting fixtures	30.00	30.00
40	lb.	Furn. and instal. elec. conductors and grounding system mat.	5.00	4.60
20	lb.	Installing elec. service equipment	2.00	2.50
Lump Sum	dollar	Installing motor control cabinet		

HIGHWAY—Surfacing and bituminous surface treatment of about 6 mi. in Montana

Montana—Silver Bow County—State. Carl E. Nelson Construction Co., Inc., was awarded a \$205,057 contract for the surfacing and surface treatment of 6 mi. of the Butte-West and Dillon highway in Montana. Unit prices follow.

(1) Carl E. Nelson Construction Co., Inc.	\$205,057
(2) Naranche & Konda	217,116
Kiely Construction Co.	217,789
F & S Construction Co.	233,301
F. R. Hewett Co.	242,611

		(1)	(2)
4,805	ton	Crushed cover material	\$4.00 \$5.00
40,021	ton	Top course surfacing	.91 1.00
140,139	ton	Crushed base course	.80 .82
67,254	gal.	First appl. MC-2 liquid asphalt	.16 .18
67,354	gal.	Second appl. MC-5 liquid asphalt	.16 .18
3,685	M gal.	Watering	2.00 1.50
1,050	unit	Rolling	8.00 8.00

BRIDGE—New 4-span continuous steel 4-girder overpass structure and approaches

Arizona—Gila County—State—A low bid of \$122,370 was submitted by Givens Construction Co. for the construction of a bridge and approaches about 20 mi. east of Globe. Unit prices follow.

(1) Givens Construction Co.	\$122,370
(2) Hagen Construction Co., Inc.	124,451
San Xavier Bros. & Sand Co.	131,334
Tanner Bros. Contracting Co.	137,726
Copper State Construction Co.	138,185

		(1)	(2)
62,150	cu. yd.	Roadway excavation	.43 .60
35	cu. yd.	Drainage excavation	1.25 1.10
450	cu. yd.	Structural excavation	2.00 1.00
500	cu. yd. mi.	Overhaul	.25 .50
1,000	cu. yd.	Borrow (CIP)	.50 .40
L. Sum		Provide water supply	1,000.00 1,000.00
2,200	M. gal.	Apply water	1.00 1.00
500	hr.	Rolling	8.00 8.00
127,600	lb.	Structural steel (CIP)	.175 .18
404	lin. ft.	Aluminum handrail (CIP)	12.00 12.00
486	cu. yd.	Class "A" concrete (incl. cement)	54.00 46.00
75,700	lb.	Reinforcing steel (bars) (CIP)	.135 .11
528	lin. ft.	24" C.M.P. (CIP except excavation)	6.00 6.50
50	lin. ft.	36" C.M.P. (CIP except excavation)	11.00 12.50
120	lin. ft.	Furnish and drive steel H-column test piles (10"x42")	7.50 9.00
2,240	lin. ft.	Furnish and drive steel H-column piles (10"x42")	6.50 5.50
15	ea.	Splicing piles	18.00 20.00
5,000	lb.	Cut-off of stl. H-col. piles (10"x42")	.10 .10
9	ea.	Right of way markers (std. C-1) (Type "B" or "C") (CIP)	7.00 5.00
200	lin. ft.	Bank protection (std. C-23) (Type "A") (CIP)	16.00 10.00

HIGHWAY—Grading, structures, and plant-mix asphalt surfacing in Colorado

Colorado—Yuma County—State. Inland Construction Co. of Cheyenne, Wyo., submitted a low bid of \$357,303 for grading and surfacing 7.7 mi. between Yuma and Eckley on State Highway No. 54

(1) Inland Construction Co.	\$357,303
(2) Average of five lowest bids	360,472
Blanchard Construction Co.	360,267
C. L. Hubner Co.	361,021
Peter Kiewit Sons' Co.	361,595
Monaghan & Smith Construction Co.	362,177

		(1)	(2)
Lump Sum	Clear and grub	\$1,000.00	\$2,770.00
Lump Sum	Rem. 9 structures	700.00	720.00
Lump Sum	Rem. reset mail boxes	100.00	100.00
3,000	lin. ft.	Remove fence	.10 .058
1,100	lin. ft.	Remove, rebuild fence	.25 .24
20	ea.	Line posts, tr. wd.	3.00 1.95
78,000	cu. yd.	Unclass. excavation	.35 .326
100	cu. yd.	Unclass. ditch excavation	1.00 .85
500	cu. yd.	Stripping	.20 .194
40	cu. yd.	D. R. excava. str.	3.00 2.30
330	cu. yd.	D.C. excavation str.	3.00 2.10
10	cu. yd.	W.R. excavation str.	3.00 2.90
40	cu. yd.	W.C. excavation str.	3.00 2.50
310	cu. yd.	Str. backfill-cl. l.	2.50 1.65

50 hr.	Mechanical tamping.....	7.00	6.20	72,000 gal.	Bit. mat., Type RC-1 or RC-2....	.15	.14
470 hr.	Roll. F.W. rolling, tand.....	8.00	8.50	9,500 sq. yd.	Portland Cement stab. base course		
270 hr.	Rolling F.W. rolling, 3 wheel.....	8.00	8.80		7" thick.....	.50	.35
60 hr.	Rolling R.T. rolling, 1 u.....	7.00	7.20	2,800 sacks	Portland cem. for stab. base course	2.00	2.00
60 hr.	Rolling R.T. rolling, 2 u.....	8.00	9.20	48,050 ton	Gravel surface, Type "B".....	.70	.64
152,700 cu. yd.	Compaction.....	.07	.09	131,000 ton	Gravel base course.....	.65	.64
2 ea.	Furn. F.W. rolling, tand.....	250.90	160.00	268,500 cu. yd.	Unclassified roadway excavation..	.20	.24
1 ea.	Furn. F.W. rolling, 3 wheel.....	200.00	220.00	177,000 cu. yd.	Imported borrow.....	.20	
1 ea.	Furn. R.T. rolling, 1 u.....	200.00	130.00	1,600,000 sta. yd.	Class "A" overhaul.....	.012	.0125
1 ea.	Furn. R.T. rolling, 2 u.....	250.00	195.00	135,000 yd. mi.	Class "B" overhaul.....	.12	.14
6,030 M. gal.	Wetting.....	2.25	2.05	12,020 1,000 gal.	Watering.....	.75	1.00
364,000 sta. yd.	Sta. yard overhaul.....	.01	.012	3,560 hr.	Rolling, tamping roller.....	8.00	8.00
14,100 yd. mi.	Yard mile overhaul.....	.12	.116	470 hr.	Rolling, pneu. tire or pwr. roller	7.00	6.00
182,200 ton mi.	Ton mile overhaul.....	.065	.066	5 ea.	Recon. clean, m'ho'e & mon. bxs.	40.00	100.00
55,300 ton	Sub-base material, Class 3.....	.33	.334	0.5 mi.	Oboliteration of old road.....	400.00	500.00
40,800 ton	Gravel surfacing—D.....	1.00	1.052	37 lin. ft.	15" spec. alk. res. pipe, Type "A",		
1,470 ton	Asphalt, 85-100 p.....	30.00	31.10	695 lin. ft.	if CM pipe is used.....	4.00	5.00
85,100 gal.	Asphalt road material, MC-P.....	.18	.166	4,100 lin. ft.	24" spec. alk. res. pipe, Type "A",		
11,000 gal.	Asphalt road material, RC-S.....	.20	.178		if CM pipe is used.....	4.60	5.00
640 ton	Stone screen, tp., 4.....	6.00	5.40	533 lin. ft.	30" spec. alk. res. pipe, Type "A",		
22,520 ton	Plant mix asphalt surf.....	3.50	3.42		if CM pipe is used.....	7.00	6.50
122 lin. ft.	Relay 18 in. pipe.....	3.00	2.40	672 lin. ft.	36" spec. alk. res. pipe, Type "A",		
70 lin. ft.	18 in. C.M. culvert pipe.....	4.00	4.10		if CM pipe is used.....	13.50	13.00
290 lin. ft.	24 in. C.M. culvert pipe.....	6.00	5.74	112 lin. ft.	42" spec. alk. res. pipe, Type "A",		
162 lin. ft.	36 in. C.M. culvert pipe.....	11.00	10.50		if CM pipe is used.....	16.00	17.00
2,500 lin. ft.	Barbed-wire fence—T.W.P.....	.25	.286	136 lin. ft.	48" spec. alk. res. pipe, Type "A",		
12 ea.	Timber guard posts.....	6.00	5.40		if CM pipe is used.....	18.25	20.00
2 ea.	Met. apr. 24 in. C.M.P. culvert.....	45.00	44.00	248 lin. ft.	C.M. pipe arch 18"x11" spec. alk.		
6 ea.	Met. apr. 36 in. C.M.P. culvert.....	115.00	100.00		res. pipe, Type "A".....	4.10	5.00
2 ea.	Met. apr. 29 in. x 18 in. C.M.P. arch C	45.00	42.00	160 lin. ft.	C.M. pipe arch 22"x13" spec. alk. res.		
2 ea.	Met. apr. 58 in. x 36 in. C.M.P. arch C	150.00	145.00		pipe, Type "A".....	4.90	6.00
70 lin. ft.	29 in. x 18 in. C.M.P. arch culvert.....	6.00	6.60	1,806 lin. ft.	C.M. pipe arch 29"x18" spec. alk.		
50 lin. ft.	58 in. x 36 in. C.M.P. arch culvert.....	16.00	15.80		res. pipe, Type "A".....	7.50	8.00
				152 lin. ft.	C.M. pipe arch 43"x27" spec. alk.		
					res. pipe, Type "A".....	14.50	16.00
				690 lin. ft.	18" concrete pipe syphon.....	6.70	8.00
				238 lin. ft.	24" concrete pipe syphon.....	9.25	10.00
				54 lin. ft.	18" C.M. pipe with soldered joints	5.00	6.00
				15 lin. ft.	Relaying 15" C.M. pipe.....	1.50	1.00
				312 lin. ft.	Relaying 18" C.M. pipe.....	2.00	2.00
				315 cu. yd.	Concrete, Class "A".....	65.00	65.00
				22 cu. yd.	Concrete, Class "A".....	100.00	90.00
				46,600 lb.	Reinforcing steel.....	.135	.14
				2,150 lb.	Structural steel.....	.30	.40
				2,000 cu. yd.	Excava. for structures, unclass.....	2.00	1.50
				1,700 cu. yd.	Small ditch excavation.....	.60	.50
				280 hr.	Mechanical tamping.....	5.00	7.00
				296 ea.	Guide posts.....	6.00	10.00
				237 lin. ft.	Guard rail.....	4.00	6.00
				30 ea.	Moving mail boxes.....	10.00	20.00
				1 ea.	Removal of existing structures (sta.		
					220+20).....	400.00	500.00
					Clearing and grubbing.....	9,000.00	9,000.00
					Removing historical marker.....	200.00	500.00
				43,800 lin. ft.	Right of way fence, Type "B".....	.30	.32

HIGHWAY—Small concrete bridge and 14 mi. of plant-mix surfacing for U.S. No. 40 in Utah

Utah—Utah County—State—W. W. Clyde & Co. submitted a low bid of \$728,299 for 14 mi. of 3-in. plant-mixed bituminous surfacing on U.S. No. 40 and construction of a 20-ft. concrete bridge.

1) W. W. Clyde & Co.	\$728,299
2) L. A. Young Const. Co. & Vernal Sand & Gravel Co.	763,043
Engineer's Estimate	777,891
LeGrand Johnson Construction Co., Inc.	779,005
Floyd S. Whiting.	809,206

20,700 ton	Plant mix bit. surf., Type "B"....	(1) \$ 2.44	(2) 2.60
35,700 ton	Plant mix bit. surface, Type "A"....	2.19	2.50
724,000 gal.	Bit. mat., Type 120-150 penetra..	.135	.14
136,300 gal.	Bit. mat., Type MC-1 or MC-2....	.15	.14

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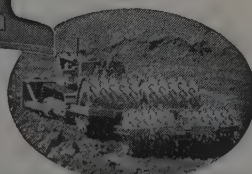


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17,100 lin. ft.	Right of way fence, Type "D"....	.32	.35
346 lin. ft.	Right of way fence, Type "C"....	.60	.70
1 ea.	42"x42" ornamental wire gate....	30.00	40.00
4 ea.	4 ft. gates.....	25.00	20.00
2 ea.	8 ft. gates (1-16' opening).....	30.00	40.00
00 ea.	14 ft. gates.....	40.00	40.00
20 ea.	16 ft. gates (4-20' openings).....	35.00	40.00
8 ea.	16 ft. gates.....	45.00	40.00
40 ea.	Right of way markers.....	45.00	40.00
130 ea.	F.A.P. markers.....	6.00	10.00
2 ea.	Furnish markers.....	25.00	40.00
	Furnishing water equipment.....	6,000.00	2,000.00
	Furnishing construction signs.....	1,000.00	4,000.00
	Concrete bridge.....	10.00	10.00
135 cu. yd.	Excavation for struct., unclassified	70.00	70.00
97 cu. yd.	Concrete, Class "A".....	10.00	10.00
12,900 lb.	Reinforcing steel.....	.135	.15
26,200 lb.	Structural steel.....	.23	.25
236 lin. ft.	Steel handrail.....	13.50	15.00
1 ea.	Preparing exist. struct. for widening	3,000.00	4,000.00

932,000 cu. yd.	Excavation, common, for wasteways...	\$.165	\$.227
4,100 cu. yd.	Excavation, rock, for wasteways.....	1.60	3.00
45,000 cu. yd.	Excavation, common, for structures...	.42	.50
1,100 cu. yd.	Excavation, rock, for structures.....	3.90	3.00
13,100 cu. yd.	Backfill about structures.....	.30	.30
3,100 cu. yd.	Compacting backfill about structures...	1.70	2.50
1,720 cu. yd.	Riprap.....	2.40	4.50
650 cu. yd.	Sand and gravel bedding for riprap....	2.25	5.00
650 cu. yd.	Rock backfill.....	2.10	3.00
110 acres	Furnishing and sowing grass seed.....	31.00	30.00
5,500 cu. yd.	Excavation, common, for roadway.....	.23	.35
4,800 mi. cu. yd.	Overhaul of exca ation.....	.28	.50
1,700 cu. yd.	One-course gravel road surfacing.....	2.60	3.00
521 lin. ft.	Furnishing and placing Type "H" rubber watercap.....	3.20	2.00
101 m.b.m.	Furn. and erect. untr. timber in struc.	250.00	250.00
85 m.b.m.	Furn. and erect. treated timb. in struc.	270.00	290.00
48 lin. ft.	Furn. and laying 8 in. diam. sewer-pipe drains with cemented joints.....	1.70	3.00
310 lin. ft.	Furn. and laying 6 in. diam pipe for drain filters.....	1.40	2.00
125 cu. yd.	Graded sand and gravel for drain filters	9.25	3.00
29 lin. ft.	Furn. and laying 18 in. diam., std.-strgth. conc.-culv. pipe with Type "B" joints	11.20	5.00
16 lin. ft.	Furn. and laying 30 in. diam., std.-strgth. conc.-culv. pipe with Type "B" joints	14.60	10.00
2,985 cu. yd.	Concrete in structures.....	57.00	40.00
4,480 bbl.	Furnishing and handling cement.....	6.80	6.00
351,000 lb.	Furnishing and placing reinforcem. bars	.14	.13
50 lin. ft.	Relaying 6 in. dia. stl. pipe-line crossing	1.70	5.00
3,000 cu. yd.	Puddling backfill about structures.....	1.15	1.50

CANAL—Wasteway structures and road relocation in Washington

Washington—Columbia Basin Project—Bureau of Reclamation. Henry C. Werner and Tauf Charneski of Eugene, Oregon; a joint venture, submitted a low bid of \$523,655 for the construction of wasteway structures, earthwork, and the relocation of a county road.

(1) Henry C. Werner & Tauf Charneski.....	\$523,655
(2) West Coast Construction Co., Inc.....	547,360
Donald M. Drake Co., Inc.....	553,411
Cherf Bros., Inc., & Sandkay Contractors, Inc.....	558,891
Long Construction Co.....	569,417

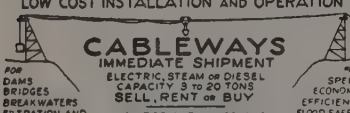
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BACKFILL, uncompacted

Colorado contractors know their bones

Twice within the last month Colorado contractors have turned up relics of prehistoric animals in connection with their excavation work.

Peter Kiewit Sons' Co., while excavating for a storm sewer in the Denver area, turned up some ancient looking bones which were later identified as vertebrae of a mammoth which probably roamed the Platte River Valley about 20,000 yr. ago.

About the same time, excavation at the Court House Square site in Denver, being carried out by Webb & Knapp Construction Corp., turned

up a fossilized molar or two which were also identified as belonging to a mammoth of about the same vintage. Each tooth weighs about 30 lb. and they were found about 35 ft. below the surface.

Possibly contractors need paleontologists to assist in classifying excavated material and aggregates.

The law tangles with "Engineering"

A directive from the Attorney General of the State of Washington states that: "A corporation or company may not use the words engi-

neer, engineering, surveyor, or surveying in its corporate or company name."

As a result, the Inland Engineering Company which has been doing business as a general contractor at Ritzville, Wash., since 1939 has announced a change in its business title. The organization will continue to operate as in the past but under a new name which will be "Northwest Power Service."

Old materials go modern

Clay and asphalt, two of the oldest of construction materials, have developed modern tendencies.

The U. S. Air Force has recently released a report describing satisfactory methods of prestressing ceramics. The report describes the high strength wires and fittings used to test these ceramic structures.

In the meantime, in Italy, chemists are experimenting with colored asphalt, with pigment developed by particular extraction methods in securing aluminum from bauxite rock. The colored asphalt would certainly relieve driving monotony and could be used to produce guide stripes.

Largest shovel to date

Records don't last long in the construction industry either as to the output of machines or their size. Now, Marion Power Shovel Company announces the largest mobile land machine ever built in the United States is a stripping shovel which handles up to 60 cu. yd. at a bite. This dipperful would fill a room 20x10x8 ft. in size. The boom is 150 ft. long and the dipper handle is 92 ft. The machine is as high as a 16-story building and the operator is lifted up to his work by elevator. In case you are interested the price tag is \$2,600,000.

Further use for worn out culverts

When your corrugated metal pipe culvert has served a useful life in carrying water under your highway fill it can be cut into appropriate lengths and made into portable bear traps. At least, this is the type of trap used in Mt. Rainier National Park to help persuade the surplus bear population to leave the camp grounds.

Deposited in the back country, as shown, the bear is supposed to decide he is unwanted, but some require several visits to the trap before they catch on. Retired highway engineers who have retired culverts are free to use this design, supplied by Armco Drainage and Metal Products, when they start bear trapping.

Twenty-five years ago in *Western Construction*

"W. E. Ryberg, president of Ryberg Brothers, general contractors of Salt Lake City, and president of the Intermountain branch of the AGC a couple of years ago, has just been elected to the United States Senate."

* * *

"T. S. O'Connell has just been named state engineer of Arizona succeeding W. W. Lane, resigned. O'Connell has been with the State Highway Department 18 yr., recently as a district engineer."

* * *

"The suspension bridge over the Royal Gorge in Colorado was completed a few months ago. It is 1,200 ft. long and 1,053 ft. above the river bed."

"Top level organization of Six Companies, Inc., has been completed and officers are: president, W. H. Wattis, first vice president, W. A. Bechtel; second vice president, E. O. Wattis; secretary, Charles A. Shea; treasurer, Felix Kahn; assistant secretary-treasurer, K. K. Bechtel."

* * *

"R. D. Rader, State Highway Engineer of Montana, announces that 313 mi. of grading, 582 mi. of surfacing and oiling, and 83 bridges were placed under contract in three lettings this year."

* * *

"Phoenix, Arizona is spending \$2,300,000 to improve its water supply system and the work is being directed by W. J. Jamieson, city engineer, and C. C. Kennedy, consulting engineer."



... The Editors

Prestressed units must fit

Prestressed concrete structural members are headed toward the day when they will be offered as standardized, manufactured products. However, this will mean dimensional consistency that has not yet been demonstrated in the average casting and stressing work.

A case in point is the problem of variation in camber experienced with the bridge beams on the first structure of this type built by the New Mexico Highway Department. The difficulty did not represent any strength deficiency as related to design requirements, but did introduce problems in field erection. Annoyance was the problem of threading cables through the diaphragm holes for transverse stressing. The varying camber in the six beams to be threaded showed that there were inconsistencies in the creep of the concrete, or in the anchoring, slipping, relaxing, or tensioning of the steel. Data and observations are presented as a part of an article describing the project in this issue. They tend to document difficulties that have been mentioned on previous projects.

Possibly the element of inexperience in casting and stressing may have been a factor. Whatever the cause, it emphasizes a point that is not minor if prestressed concrete is to emerge into a position of structural importance. Specifying tolerances is not enough if the member, after stressing, exceeds these allowances.

The strength of prestressed units has been proved most adequate; tests to destruction have convinced designers that they can rely on getting the strengths they specify. No complaints have been raised on this point. But the next problem, as mass production takes over, is to turn out members that arrive on the job with allowable variation in dimensions. Licking this problem will be necessary for maximum progress in this modern development. It may require the combined efforts of concrete technicians and a search for practical answers from supervisors and crews in casting and prestressing yards.

What about errors in bidding?

Where is the line to be drawn in excusing errors in bidding? Recently there have been a growing number of cases where a contractor has submitted a low bid that was found to contain an error. Usual procedure is for the contractor to rush up evidence to show that the situation was caused by a mistake in calculations or clerical work, rather than a result of judgment or intention. The awarding agency is then on the spot. It would be the fair thing to accept the evidence of inadvertence. But there is the matter of precedent involved and how many times can this be done, and where is the line to be drawn?

From an impersonal point of view, there is no reason to make concessions on the part of the awarding agency. Contractors are asked to submit proposals to do a certain piece of work under terms and conditions spelled out in the most detailed engineering and legal terms. If one of the bidders makes a mistake and bids too low, so what! The awarding agency had nothing to do with it.

Two important factors tend to point to a liberal approach to bidding and awarding. First, there is the complexity of unit-bid items. Second, the time allowed in the bid call is often much too short for preparing a proper estimate and bid—a frequent item of complaint.

Assume an estimate is being prepared without undue pressure of time and the estimator puts in a unit at, say, \$10, and the contractor in looking over the estimate approves this unit price. In the final extension of the unit to the total, or in transferring to other sheets, somebody made the error that put the item in at \$1.00. Elemental justice is on the side of the contractor who asks mercy for an obvious mistake that was unintentional.

On the other hand, the officials of the awarding agency calling for the bids have the responsibility to accept the offer from a qualified firm putting in a low bid. The agency is not required to explore into or be concerned with the adequacy or competence of the contractor's staff.

Next, there is the point as to whether the contractor is to be allowed to merely withdraw the entire bid, or allowed to adjust his bid by correcting the clerical error. Certainly, if agencies and courts let down the bars and allowed every bid to be submitted with the understanding that errors could be corrected, or the bid withdrawn after being made, then there would be no force remaining in the term "a firm bid." Estimating and bidding practices would grow sloppy, and contractors become careless.

It would be too harsh to make a blanket recommendation that there be no allowance for the inadvertent bidding error that is serious enough to cause a business ruin. On the other hand, a firm attitude must be maintained by awarding agencies to assure a proper check on a matter that could get out of hand.

AUSTIN-WESTERN HYDRAULIC CRANE

Helps Build Air Base in RECORD TIME



Unit Handled 620 Forms per Day for D. W. Winkelman Co.

Says W. G. Robinson, Project Manager
Plattsburgh Air Force Base, Winkelman-Tompkins-Jones
Plattsburgh, N. Y.

"On this job, we were required to set forms 14 hours a day on one shift, and keep two shifts ahead of three pavers that were working around the clock. Handling these forms required a most dependable and highly maneuverable mobile crane, that could go anywhere in the sand.

"This hydraulic crane was also called upon to do numerous jobs in the field and around the job. With it the men were able to speed the replacement of

motors and other heavy equipment; change the wheels on earth-moving rigs, and replace tires. The 18' boom responds instantly to the operator's touch with a positive action and a 360 degree rotation. The power boom is controlled hydraulically; extends with a live load, and lifts while it pulls, as the crane moves forward and back.

"Our A-W hydraulic crane has done a job on the Air Force base at Plattsburgh that had to be done, and on which there was no alternative way to do it and make speed, even with a large crane."

For the complete Winkelman story, write for Gould Report No. 5512.

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